



COAL AGE



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No. 27

8,760 Hours

The year 1916 had 8,784 hours. The new year will have 8,760. Success depends on the proportion of time used to the time wasted.

Check up your past year's record. You'll be astonished at the total of hours lost. Remedy the trouble. Make the new year a busy twelve months. Make it your year of maximum effort and efficiency.

The man who buys a bottle of medicine, takes a couple of doses, and then stops the treatment, is the same kind of fool as the fellow who works a day with enthusiasm and energy and then lags and loafs through the balance of the week. It's the unceasing, every-day hammering that counts.

The individual who would succeed must have health. Ability without health is like a locomotive without fuel to make it go. The man who is off the job two or three months each year because of illness is no more valuable to his company than the fellow who is away from his duties two or three months because he is too lazy to work. We may feel sorry for the sick man and condemn the lazy one; but, sentiment aside, the weak and willing brother is no more

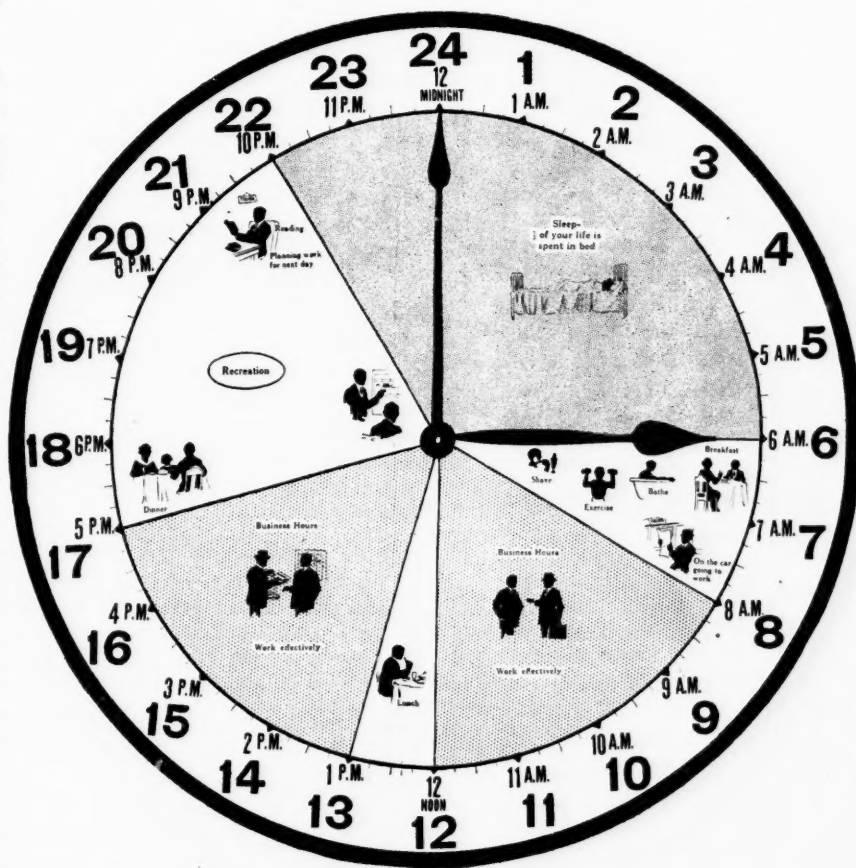
effective as a dividend producer than the lazy employee who is generally absent when most needed.

Therefore, if constant plugging and good health are the two chief requisites to getting ahead, we must systematize our daily life. System is the foundation of efficiency, and regularity is the basis of health. The biggest men the world has known have lived on schedule. In no other way is it possible to utilize effectively even a reasonable part of the hours in the year.

The illustration here shown is one great industrial captain's idea of "How To Live on 24 Hours a Day." The plan suggested may not be suit-

able for all of us. In fact, it is not practicable in the case of many mining men. However, the thought embodied in the proposed system is worthy of close attention.

Let each of us start the new year with a definite daily schedule. Often we will be obliged to depart from the routine. Yet none of us can help but be happier, healthier and more successful if we live in a systematic fashion. And we will utilize more of those 8,760 hours, none of which tarry to suit our pleasure.



Ideas and Suggestions

Waste in Mining

By J. W. BAIR*

Much has been said and written in recent years concerning the conservation of coal, but little has been done to actually prevent such waste except by some of the larger companies.

A writer recently made the statement in the *Saturday Evening Post* that "for every ton of coal mined, half a ton is lost in the operation." While this is true in some cases of both large and small operations, it must be said that most of the larger concerns are installing equipment and adopting methods of mining which reduce the above estimate considerably.

IMPROPER OPENING AND DEVELOPMENT OF COAL PROPERTIES

The chief cause for a small percentage of recovery is owing to improper methods of working in the first mining. Frequently, when a new property is to be opened up, instead of taking into consideration the amount of cover, strength and character of the roof and floor, thickness of the seam, texture and inclination of the seam, character of labor available and other important details, the system used at a nearby colliery, if successful, is too often adopted. This plan frequently results in the headings and rooms being driven too wide and not leaving sufficient pillars to support the overlying strata, which often causes a squeeze and the loss of an entire heading or section of a mine.

One cause for an excessive amount of coal being lost is having surveys made merely to comply with the Bituminous Mining Laws. Surveys are made semi-annually (sometimes) and between the time of the surveys, headings and rooms are turned off and driven without sights, usually until they cut into some other place, leaving little if any pillars with the result that they nearly always cave before the pillar is extracted. Some companies look on engineering only as a bill of expense, when in reality it is a case of spending pennies to recover dollars.

LOSS DUE TO USE OF MACHINES

Another reason for an excessive amount of lost coal is the use of chain machines in seams to which they are not adapted. I have in mind several mines, operated by both large and small companies, where chain machines are being used, the bottom of the seam being extremely rolling and containing numerous pyrites. In these mines coal varying in thickness from 3 to 12 in. is left on the bottom in nearly all places, and I have measured as much as 24 in. left on, with little if any effort being made to have it taken up. If the miner is asked why he does not take up this coal, he will invariably answer that he is not being paid for pick mining. In the mines referred to the lower section is as good and sometimes better in quality than the balance of the seam.

The cutter is not to blame in most instances, as it is impossible to incline the machines to meet the pitch of the rolls.

In seams having no rolls or pyrites in the bottom, oftentimes from 3 to 12 in. is left on the bottom, mostly due to the rise or dip of the coal, combined with ignorance and carelessness on the part of the cutter. There is a reasonable excuse for the first cut on a sharp rise or dip leaving some coal on the bottom, but if it were taken up before making the second cut, the cutter would have a better idea of the angle to incline his machine and the next cut would no doubt be cleaner.

A much larger percentage of coal will be recovered if machines are installed to suit the conditions under which they are to be operated. The puncher has long since been termed "behind the times," but there are conditions under which it can be used to great advantage. For instance, I happened in a place recently when the cutter was changing bits for the fifth time in the one room, this being necessary on account of the numerous pyrites encountered in cutting the place. This room could have been cut fairly well with a puncher.

The mine officials do not seem to realize that every inch of coal lost in this manner covering an area of one acre represents a dead loss of approximately 134 tons, or for every foot over the same area 1,608 tons. This is a complete loss, as the same yardage and other expenses have been paid as though the full seam were recovered. Another bad feature of leaving coal on the bottom is the fact that the posts are usually set on top of the coal, as most of the miners will cut their props rather than dig a hole to the solid bottom.

PILLARS AND STUMPS LEFT STANDING

In many cases room pillars and heading stumps are left standing. This happens sometimes because of the possibility of encountering gas or water, or both. Also in gaseous mines the ventilating system prohibits the immediate drawing of pillars, and there are many other reasons for allowing them to stand. By the time preparations are made to meet the conditions, the rooms and headings are in such shape that only a small percentage of the pillar coal is recovered, the remaining pillars causing a roof weight that is always a menace to other sections of the mine.

PLACES ABANDONED TEMPORARILY

Then there are the rooms and headings which are abandoned temporarily, with all expectations of having them started up in a short time. Stopped sometimes on account of a poor coal market, sometimes because the coal is not quite so good or so high as in other portions of the mine, and the men are hard to please. Some companies change mine foremen every three to six months. About the time a new foreman becomes acquainted with the mine and locates the standing pillars he is removed, and the coal is lost before his successors discover where it is. In the meantime several surveys are made, and

*Mine inspector, Wilmore Coal Co., Windber, Penn.

often these places are marked on the maps "worked out," when in reality the pillars have never been touched.

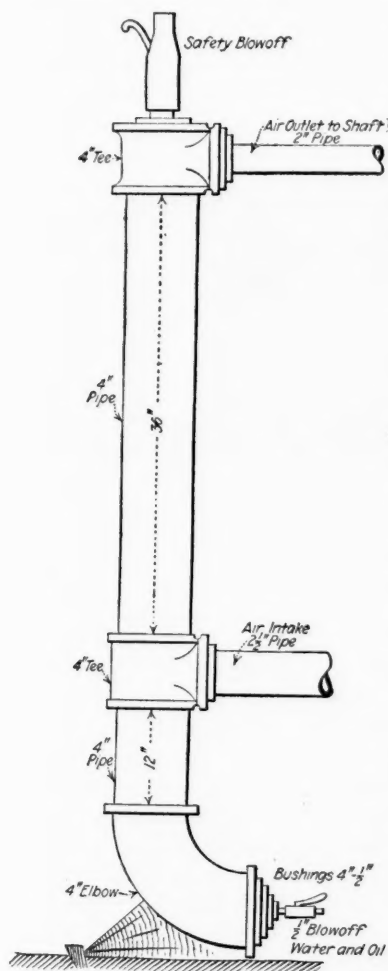
There are many other reasons for causing the statement to be made that we lose half a ton for every ton mined, and while on first thought this amount sounds large, there are lots of mines today that are not recovering over 66 per cent. of the coal, especially in the smaller seams and where the roof and other conditions are bad.

Oil and Water Separator for Compressed-Air Line

By J. F. KELLOCK BROWN*

In any remote prospecting operation an oil and water separator such as that illustrated will be found to be a useful and handy piece of apparatus. The use and care of compressors on such work is not scientific, the men

available for the work are ignorant, and so it frequently happens that oil troubles develop in the machines underground. When you add to that the freezing due to moisture in the air, the value of any kind of apparatus that will help to mitigate these drawbacks is apparent. A separator should of course go along with every compressor, but we all know what prospecting outfits are—there is always something that should be there but never is sent, and a separator on the air line is one of the things frequently conspicuous by its absence. Usually there is nothing available from which to make one. This at least was the case on the work where the separator described was used. Its construction will



DETAILS OF WATER SEPARATOR

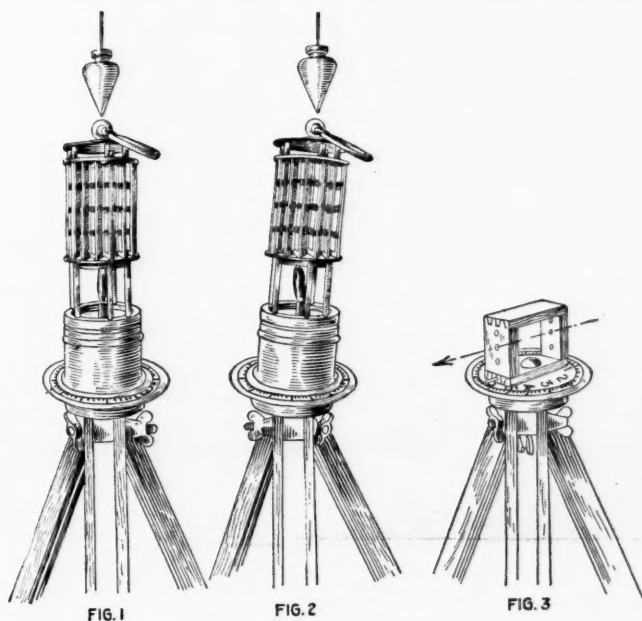
all that is required. The air intake from the compressor was a 2-in. line and the outlet 2 1/2 in. The separator itself consisted of 4-in. pipe with the necessary tees and elbows to suit. Above the air exit the 4-in. tee was bushed down to hold a 2-in. safety valve, while the foot of the separator, which ended in an elbow, was also bushed down to hold a 1/2-in. turn-cock taken from an air drill. By watching and keeping the lower space clear of the collected moisture and oil that came over from the compressor, a great improvement in the quality of the air was obtained.

*Mining engineer, 247 Esplanade, Sydney, N. S.

A Novel Example of Amateur Surveying

We have all probably heard of the famous civil engineer who built a railroad with a grape vine and a hand compass. Mining engineers have probably viewed this record with some envy. However, there has been one of the profession who we believe has now set the pace for new endeavors along this line.

This versatile engineer was confronted with the task of making a survey to drive a connection, without any instruments of any kind other than a cloth tape. For an instrument he used a camera tripod, to the top of which he attached the dial of an old alarm clock, as shown in the accompanying sketch. For the purpose of sighting and reading angles, a section of a small box was cut out and a hole bored in the horizontal member at the center,



THE IMPROVED "TRANSIT"

by which it was attached to the face of the dial on the tripod by means of the thumbscrew on the latter. In the two vertical pieces at the ends three holes were bored, through which the sights were taken. The angles were read as indicated by means of a small pin placed near the bottom of the box.

In setting up the instrument a safety lamp was placed squarely over the center, and the top of the lamp centered under the plumb bob suspended from the roof. The instrument was leveled by lengthening the flame of the lamp and bringing it exactly parallel with the vertical bars around the glass globe. The illustration shows how a slight variation from the horizontal is readily detected in this manner.

In reading angles each five-minute division on the clock dial of course indicated an angle of 30 deg., and the remainder of the subdivisions in proportion. The survey was plotted roughly by means of a protractor and a 2-ft. rule. A subsequent resurvey over the same lines with a transit indicated that the original work had been done with sufficient accuracy to meet the requirements imposed by the work in hand.

We are indebted to Joseph A. Greaves, Box 182, Dunbar, Penn., for this interesting account.

The Bituminous Coal Mines of Crow's Nest Pass--II

By P. M. SHERWIN*

SYNOPSIS—Various operations from the town of Frank westward are here described. One or two of these mines have a daily capacity of 3,000 tons or more. The pitches are so steep and other conditions so favorable that much of the coal will "run," making the cost of mining small.

The next station on the line is the town of Frank, where the mines of the Franco-Canadian Collieries are located. It was here that coal was first discovered in the Crow's Nest Pass, and what is now known as the Old Mine was the first one to be operated. The Old Mine is situated directly under the base of Turtle Mountain, and by some authorities is held to be responsible for the great slide of that mountain that took place on Apr. 29, 1903, in which disaster more than 80 people were buried in their homes under tons of rock. Nineteen men who were in the



FIG. 9. THE GREAT SLIDE OF TURTLE MOUNTAIN

mine at the time dug their way out, while one horse was found living after being entombed for 28 days.

The mine was closed for over six months after the slide while repairs were being made. The property is now in the hands of the Franco-Canadian Collieries, Ltd., a French company. The pitch of the seams here varies from 85 deg. west to 42 deg. east, the measures being quite rolling. The thickness averages about 12 ft., although in some places it reaches as much as 30 ft. for short distances. The first tunnel was driven at the base of the mountain about 20 ft. above the level of the Crow's Nest River

*Engineer, Franco-Canadian Collieries Co., Frank, Alta.

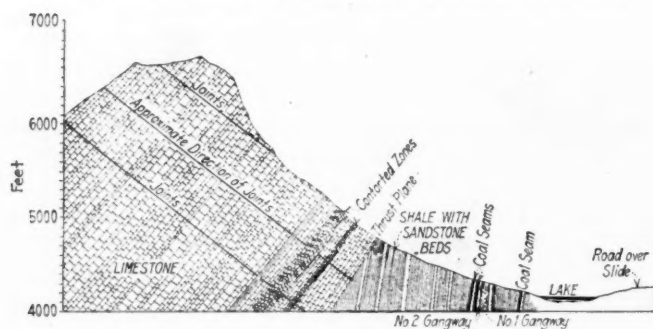


FIG. 10. SECTION THROUGH TURTLE MOUNTAIN, SHOWING COAL MEASURES AND LIMESTONES

and reached a length of over 9,000 ft., when the coal became so faulty that further operation proved difficult.

The workings above this main entry extend right up to the surface on the shoulder of Turtle Mountain and in some places are 1,200 ft. above the gangway. On account of the steepness of the pitch the angle system was almost universally used. The wide breast system was tried, but it was found to be unsatisfactory because of the enormous pressure exerted by the limestone formation of Turtle Mountain.

After the rooms or angles were driven up, little work was required to mine the pillars, the coal usually running just about as fast as it could be taken away. A fire in the upper workings finally necessitated the sealing

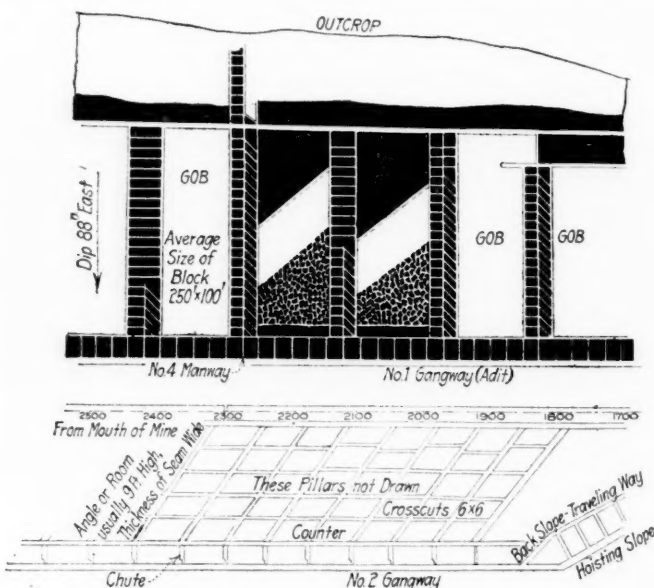


FIG. 11. WORKINGS ON STEEP PITCHES; CHESTNUT CHUTES ABOVE, ANGLE SYSTEM BELOW

up of all airways to a distance of 7,300 ft. from the mouth of the mine, and a lower lift was started by sinking a slope 1,200 ft. distant from the entry to a vertical depth of 240 ft. Before work started on this lower lift, haulage was performed by a main and tail rope that operated inside as well as outside the mine, the tippie being located 1,700 ft. from the mine across the Crow's Nest River.

After the lower lift had been started, gasoline locomotives took the place of the rope haulage; but on account of the steep grade (2.5 per cent.) against the empties, and the difficulty experienced in the winter on account of the large amount of snow in this locality, the cost of operation has been rather high, being a little over 4c. per ton-mile.

Improvements are now under way that will reduce the grade to 0.5 per cent., and the erection of a snow shed from the mouth of the mine to the tippie will do away with the difficulty occasioned by the snow.

The capacity of the mine at the present time is 400 tons per 8-hr. shift, but a new 15-deg. double-track slope now nearing completion will take the place of the 30-deg.

single-track slope at present in use, raising the capacity to about 700 tons. There are four other adjacent seams proved, but only one, about 400 ft. to the east, is of any commercial value. It is the plan of the company now to develop this seam by a rock tunnel from the present workings. Considerable gas is found at the faces of this mine, although probably not so much as in some of the other mines of the district.

Great difficulty was experienced a short time ago in forcing air to the extreme working faces in No. 2 (slope) gangway, owing to the leakage of air through chutes near the slope bottom where coal had been pulled. It is inter-

The workings are also extended to the north, where they approach Goat Mountain, which is of limestone (Paleozoic) formation. The shaft was sunk along the pitch of the coal and reaches a depth of 330 ft., from which level two slopes open up a lower lift at a depth of 606 ft. The output from this mine at the present time is small (350 tons), owing to the poor arrangement of the shaft landing. A new slope being driven and nearly completed to the surface will soon do away with the shaft.

The total output of the two mines when all the developments now under way are completed will be 800 tons per 8-hr. shift.

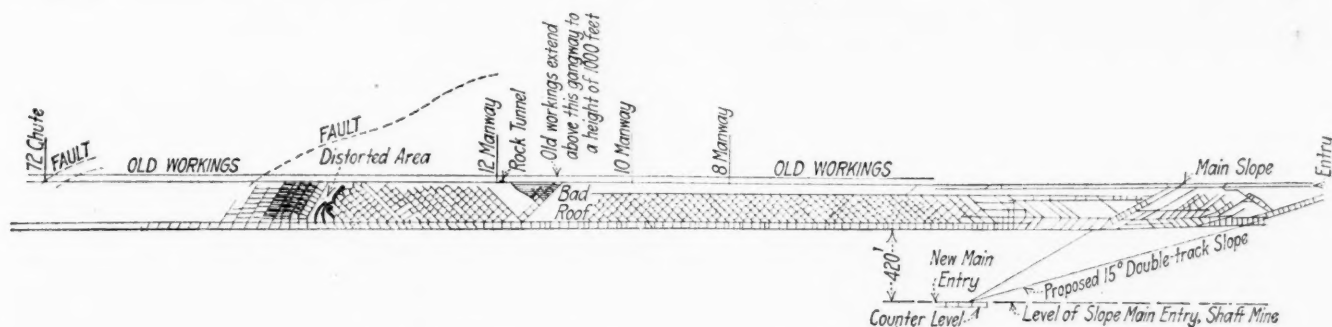


FIG. 12. GENERAL PLAN OF OLD MINE AT FRANK, ALTA.

esting to note that none of the coal taken from these chutes has to be mined. As a matter of fact for days at a time the coal buckers never get above the counter entry. Thousands of tons of coal have been taken out in this way.

Horse haulage is used on the lower level. The cars hold two tons and are of the front dump variety. The slope hoist handles two cars at a time, the average time for the round trip being 3 min. 41 sec., with a slope length of 504 ft. The hoist is situated at the mouth of the mine, the rope being carried horizontally for 1,200 ft.

The pumping equipment consists of one 150- and one 220-gal. electrically driven centrifugal pumps. Owing to abnormal conditions last spring, the river rose to an unprecedented height and threatened to flood the mine. A 606-gal. American Well Works pump was purchased and hurriedly set up, and by this means the water was kept under control. In the dry season one of the smaller pumps is quite ample to keep the mine dry.

The shaft, or No. 2 mine of the same company, was opened after the slide had closed the Old Mine and is operating on the same seam. It is being worked to approach the Old Mine and will eventually be connected with it.

The ventilation in the Old Mine is by exhaust, a Sullivan fan of 50,000-cu.ft. capacity being employed; at the shaft a smaller force fan is used.

Frank, as mentioned before, was the first mining camp in the Pass. After the slide of Turtle Mountain, which occurred two years after the opening of the mine and five years after the completion of the Crow's Nest Pass branch of the Canadian Pacific Ry., all the houses within the danger zone were moved northward to a new town site. However, the place will forever present a forbidding aspect, and it is with awe that one looks up to the jagged crags that form the new peak of Turtle Mountain, the old summit having been about 500 ft. higher before the slide.

A total of 90 million tons of material is estimated to have come down on that fateful morning in April, 13 years ago, and over a square mile of country was laid waste. The railway tracks are now 12 ft. above the original grade.

There is no indication at the present time of just how deep the seams will go before the syncline is reached, but it seems reasonable to suppose that the seams are the other limb of the Bellevue syncline and a continuation of the Hillcrest formation.

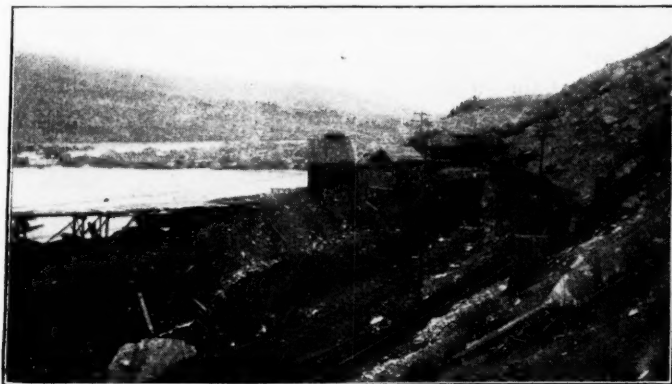


FIG. 13. MOUTH OF OLD MINE AT FRANK, ON WESTERLY EDGE OF SLIDE

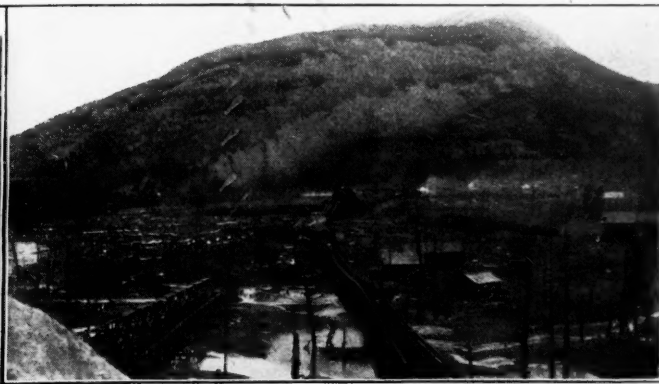


FIG. 14. VIEW NORTHWARD FROM SAME POINT AS FIG. 11

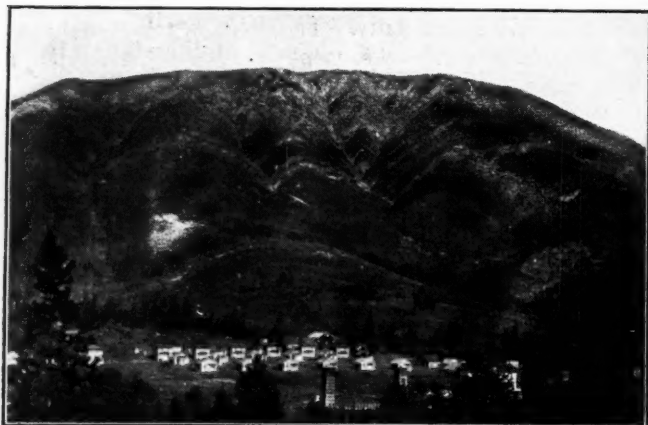


FIG. 15. DESERTED VILLAGE OF LILLE

From Frank the Grassy Mountain Ry. branches off to the north and follows the valley of Cold Creek for seven miles. Five miles up this line is the town of Lille, where the West Canadian Collieries operated a mine. The coal is about 5 ft. in thickness and of an excellent quality. The company here erected 50 Belgian coke ovens, the only ones in the Pass, but on account of the high operating cost of the railway this mine has been abandoned, and the town is deserted.

Leaving Frank, the valley quickly becomes narrow, and passes through a gorge between Turtle and Goat Mountains, known as the "Gap." One mile from Frank is the town of Blairmore, where the headquarters of the West Canadian Collieries are located and where this company has two mines, one abandoned and one operating.

Proceeding farther, the valley widens out again, and after five miles of travel Coleman, a prosperous little town under the shadow of Crow's Nest Mountain, is reached. Here are situated the mines of the International Coal and Coke Co., an American concern, and also those of the McGillivray Creek Coal and Coke Co., the latter's plant and mine being situated about a mile up the valley.

The International has five seams on its property, of which two are worked, one 13 and the other 6 ft. in thickness. Both seams are opened by means of levels driven on the strike. The usual room-and-pillar method is em-

ployed, the pitch being about 32 deg. The capacity of the plant is about 3,000 tons per day. Two hundred and sixteen beehive coke ovens are installed, the coal being delivered to the ovens by means of electric lorries.

The McGillivray Creek company's mine is situated to the right of the valley, about half a mile from the railway and the tippie. One seam about 10 ft. in thickness has been developed by means of a slope with levels driven from its foot.

The coal is hauled from the mine to the tippie by electric motors. The capacity of the plant is about 2,000 tons.

We have now reached the end of the Alberta side of the coal field. The Paleozoic limestones have entirely over-



FIG. 16. ENTRANCE TO NO. 3 MINE AT BLAIRMORE. COAL TO RIGHT

ridden the coal-bearing Cretaceous sandstones, and it is not until we reach the other side of the Pass at McGillivray that they are exposed again. Here the Eastern British Columbia Ry. branches off, following the south fork of the Michel River for about 15 mi., to the town of Corbin.

The Corbin Coal and Coke Co. is operating what is perhaps the only stripping operation in Western Canada. The coal reaches in places a thickness of 250 ft., because of the compressed monoclinical folding of the seam. One mine is worked at the bottom of the valley by a tun-

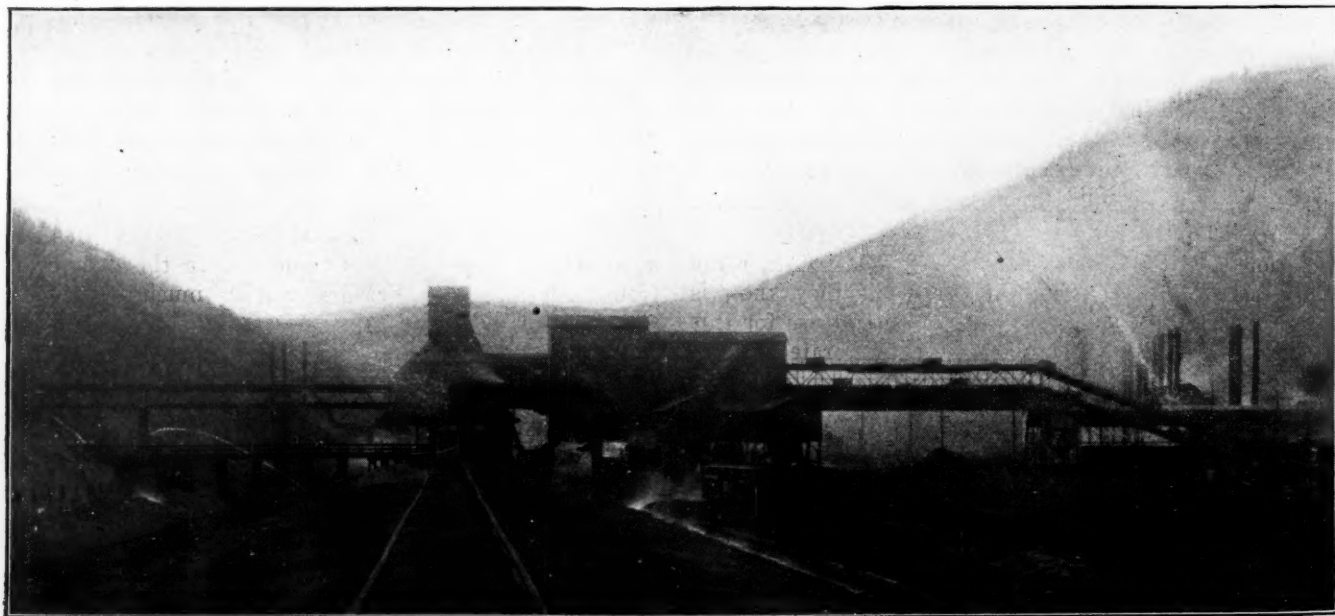


FIG. 17. TIPPY OF CROW'S NEST PASS COAL CO. FROM TOP OF THE COKE OVENS

nel along the strike of the seam, while the other is situated nearly 1,000 ft. above the river. Here the coal is loaded by steam shovel, after the overburden has been shot off. The distance from McGillivray to Coleman across the Pass is 16 mi.

Six miles farther along the line is Michel, where the mines of the Crow's Nest Pass Coal Co. are situated. It was at the No. 3 mine of this company that an explosion occurred about two months ago, during a severe thunderstorm, in which 12 men lost their lives. It is generally believed that lightning followed the rails and ignited gas present in the workings. Only a few bodies were recovered, the traveling ways being so severely damaged that it was thought unwise to try to open the mine again.

At Hosmer, 15 mi. down the creek, are the mines of the Department of Natural Resources of the Canadian Pacific Ry. A rock tunnel was driven across the measures, and a total of 10 seams was found with an aggregate thickness of over 100 ft. Of these seams the first, ninth and tenth were worked, but at the present time the mines are closed, owing to the great amount of gas given off and the difficulty of proper ventilation. There is a battery of 240 beehive coke ovens at this plant.

The Coal Creek mines, five miles up Coal Creek from Fernie, are the last mines of the Crow's Nest field. The coal seams strike approximately at right angles to the valley, thus enabling tunnels to be driven on the seams on each side of the creek. Five seams are being worked here, with a total thickness of 38 ft. In all except one bed the coal is worked by the pillar-and-stall method. The exception is No. 2 seam, where the longwall method is employed. The pitch of these beds is much less than usual in this field, being only 12 to 17 deg.

Mine haulage is by horses and air locomotives. From the various mines the cars are collected and hauled by electric locomotives to the tippie, a steel structure over 800 ft. long, bridging the whole valley and having a ca-

capacity of 4,000 tons daily. The slack is taken to Fernie and used in the 450 coke ovens situated there.

There is always a good demand for Crow's Nest coal on account of its high thermal content, and at the present time the mines can hardly fill the demand imposed upon them. Owing to the violent displacement that the seams underwent, the coal is mostly slack, so much so that only a few companies in the Pass have screening facilities, and only one or two of these use them. Owing to the steep pitches, the coal can be mined cheaply, and it is therefore possible to compete with American steam coal as far as Spokane. The Canadian Pacific R.R. is the principal buyer in the field and uses the coal for locomotive fuel as far east as Broadview, Sask.

The mining cost is about 55c. per ton for wages on contract coal, 43c. on pillar robbing, and the coal mined per man in one shift is about 15 tons. A great deal of the coal is mined much cheaper, as in the steeply pitching seams the pillar coal, when once started, usually keeps running until the roof collapses. Sometimes this allows a great deal of coal to come down, as the roof is generally hard sandstone and stands up so well as to crush the coal in the remaining pillars. To prevent this all the ribs have to be well timbered and held by slabs, making the cost of timbering considerable, running as high as 12c. per ton mined. The miners as a rule are paid on the basis of the number of cubic yards mined, since under the system employed it is impracticable to keep the coal of the various contracts separate.

The outlook for the industry is good, as there is a great deal of coal in sight, which can be handled by existing plants for years to come. It is generally expected that when the workings approach the synclines the percentage of lump coal will be considerably increased.

I wish to acknowledge my indebtedness to D. B. Dowling and W. W. Leach, of the Geological Survey of Canada, for much of the geological data herein contained.

Collection of Data

BY CANADIAN CORRESPONDENT

SYNOPSIS—A "one-man" system for collecting and filing data and useful information. Material from any source may be preserved in a readily accessible condition by this method with only a few hours' labor periodically.

Most mining men, with the exception of those able to maintain private secretaries or office staffs, find the collection of data an irksome and wearisome task, while at the same time admitting it to be one they know is necessary. There are numbers of systems in use for this purpose, but most of them are rather elaborate and require much time and attention to keep in order. No system is worth anything at all unless it is kept up to date.

Personally, I have tried card systems, book systems and filing systems, and have ended by discarding any one as a complete method, and installing one that, while it can hardly be dignified by the name "system," is nevertheless satisfactory for my requirements because it is simple, involves little labor and takes care of material that comes to me in all shapes and forms.

The arrangements made were based upon a consideration of the data collected and included information on coals and coal lands, iron ores and allied minerals, oil shales, freight and shipping, and data relative to minerals and their extraction. This information was received from all sources—scraps in certain papers, whole magazine articles, reports, books, catalogs, etc.

While a nice, uniform card or filing system is satisfactory and pleasant to look at, it is obvious that such a reduction to uniformity would, where the data come from such diversified sources, involve much useless destruction of papers and a great deal of unnecessary typewriting. So instead of hacking magazines to pieces, or tearing books apart, or rewriting whole articles, what was finally done was to classify the sources from which information came and provide a means whereby each source—either a clipping or a book—would be retained intact. An index was utilized to bind the whole together.

The classification of the sources worked out in this case is as follows: (1) Books; (2) magazines; (a) publications received regularly, (b) irregular copies; (3) reports and sundry papers; (4) correspondence; (5) quotations; (6) personal experience; (7) catalogs.

Books and magazines that are regularly received are solidly constructed and cannot well be taken care of except in their entirety, unless one goes to the extent of copying just those parts that are considered of special value. This has the disadvantage of perhaps destroying some items or a chapter that may afterward be of use. The same remarks apply to certain of the catalogs.

Magazines of which only irregular copies are received, and reports, generally produce foolscap or smaller-sized papers of perhaps two or three pages. Sometimes they only produce clippings, like certain of the catalogs. This is material that can be clipped. Correspondence, quotations and personal experiences commonly produce material that has to be rewritten and perhaps condensed. Material and information received from catalogs and from quotations is apt to change and therefore requires to be treated in such a manner that the portion that time makes unreliable can easily be discarded.

It appears therefore that there are a number of states or sizes in which matter comes to hand, each of which, if there is not to be too much labor involved, has to be

are treated. Instead, the technical journals are subscribed to, and always watched for interesting news. These journals are more up to date and provide more day-by-day information. For somewhat similar reasons I get all the Government and state publications that interest me, in preference to joining the various mining societies for the sake of getting their transactions.

Catalogs and books when received are placed on the bookshelves behind my table (see Fig. 1). These bookcases, which are added to as required, have their shelves numbered, and the material is roughly arranged thereon by placing catalogs on one shelf, technical books on another, bound journals on a third, Government publications and pamphlets on a fourth and transactions on a fifth. I find that the shelf containing the Government and state publications overflows into another compartment. No attempt at arrangement is made other than to classify this material into subjects. This is already done by the books themselves. All that is wanted is to know that there is a book or a pamphlet on a certain subject to be obtained from such and such a shelf.

All the material that is collected in the files goes into a cabinet that stands alongside the bookcases. Here it is arranged at first under letters denoting subjects. As it grows, it is found a help to place a subject tag in front of the letter index, especially in certain subjects such as "methods of operation," which grow much faster than some others. Commonly there are a number of letters for which there is little use, and there are others such as "c" under which every subject seems bound to come—coal cutters, conveyors, costs, coal areas and other literature of a kindred nature.

MAIN SUBJECTS ARE SUBDIVIDED

These are what might be called the main-letter subjects. They are subdivided, with inter-index leaves alphabetically arranged. Thus a large "C" faces you on the index card on the right-hand side, while a subject index is on the left. Once a year, perhaps, all these files are gone over and any material that seems to have been inadvisably collected is thrown out. This provides against the collection of material that is out of date or that was wrongly adjudged at first.

Again, in the filing system, no attempt is made to keep track of every separate article that goes into the files, or any special part thereof. In ninety-nine cases out of a hundred, when it becomes necessary to search for information, what is wanted is general not particular information. It is not as if I wanted to find a certain paragraph in a letter; it is rather that I want to get as quickly as possible all the information that I may possess on a method of mining, or about a certain coal district. Consequently, the whole file is extracted and taken away bodily. Any one paper may have a bearing on the subject, and it is only study that is going to reveal its availability.

Clippings and typewritten material are treated on a loose-leaf sheet that measures 9x12 in. This enters the carriage of any typewriter and still provides a fairly large sheet area on which to write. The sheets are plain, so that drawings can also be made upon them. Clippings are easily pasted thereto. These sheets go into a binder that is allowed to get fairly full before any index system is attempted. At first this system is simple, consisting of clip tags in letters. Afterward, as the subjects grow, these are elaborated like the filing arrangement.

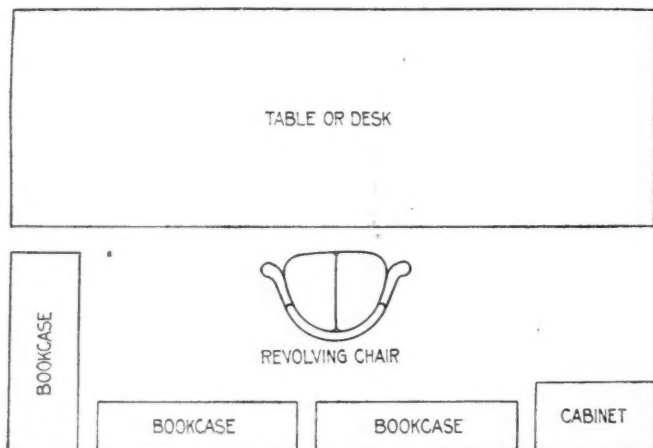


FIG. 1. ARRANGEMENT OF ROOM

accorded separate treatment. There is the solidly bound material, the single articles, the clippings and the rewritten stuff. To take care of all this it is dealt with as follows:

1. The books and catalogs, if strongly and well bound, remain as they are.
2. The regular publications are bound in half-yearly volumes.
3. Any articles from the irregular journals are extracted, the sheets punched together and filed away in large-sized pocket files under the proper letter.
4. Reports and quotations that are long and important enough to be treated in similar fashion go into pockets similar to those used with the articles and are filed along with them.
5. All sundry material, clippings and extracts from correspondence, which has to be typewritten, is disposed of on loose-leaf sheets and filed in a binder.
6. Two notebooks are kept. One contains all analyses of coals, ores and any other mineral, irrespective of whether or not the information is contained in an article filed elsewhere. The other contains a list of technical papers and articles that have come to my notice, but of which I have not obtained a copy.

Books are seldom bought, except perhaps for the sake of useful tables or formulas, or in those rare cases wherein the principles of a subject in which I am interested

Unlike the files, material that is in this binder is seldom removed from the office. Instead, if the data contained are required, they are jotted down in a notebook and taken along in that way. Lately I have started one of these binders for special formulas, statistics and figures handy in making calculations. This volume I generally carry with me if going any distance.

The sheets are arranged to go into the binder at the top, so that the binder opens away from the person using it. This is done because a binder, when it is getting fairly thick, is awkward to keep open with the left elbow while extracts are being made with the right hand. I find it easier to handle if it opens at the top, although this may be a matter of habit.

The index in use is of course the key to the whole situation. This is placed on cards and occupies one drawer of the four-drawer cabinet that is placed on the

SUBJECT:- TRANSVAAL COAL	
WHERE:-	
1	Bookcase I. Geo. Transvaal (Geo.)
2	File T. Coal Min. Transvaal (Gen.)
3	File Tw. Tweefontein Coll. (Costs)
4	Binder I.C. Cosc. Transvaal

SUBJECT:- COST MINING TRANSVAAL	
WHERE:-	
1	File Tw. Tweefontein Coll.
2	Binder I.C. Cost Transvaal

FIG. 2. TWO SAMPLES OF CARDS

top of the filing cabinet. There is nothing peculiar about the index. It is a double- but not a cross-index; that is, each paper or article may be mentioned twice in the index, but both times under the heading of the subject to which it refers.

There is no attempt at making the index find information under the heads of the authors of the reports or articles. It is immaterial to me who is the author of the information; the essential thing is to know that it is there and where to find it. It is a mere incident where it came from. I judge of its reliability by comparison with other data and my own experience.

The index, however, is arranged to do a little more than merely show that what is wanted is in such and such a folder. If, for example, information is wanted on coal mining in Peru, I may find on turning to "Peru" in the index that there are five places where coal mining is mentioned; but I also find that the card indicates briefly the scope of each article, or clipping, arranged under such heads as general, costs, geological, etc. A single word tells me whether to take the whole lot out or reject several items. If I wanted costs on coal mining in Peru, I could also find that information under that heading on another card.

While this system of indexing is not by any means complete, it serves the purpose for which it was installed; and I now find that there is a better chance of getting

what I want than there was when the material was taken down on cards or clipped into scrapbooks.

The foregoing method is designed, as far as it can be said to have design, as a one-man system, and it can be carried on with little difficulty. A few hours a week serve to keep it in full working order. Having the material placed right behind the desk I find to be very satisfactory and convenient, as it may thus be readily got hold of.

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Recollections of a Manager

The fact that our directors had given the Associated Charities more coal than they had asked for or even expected, reached the ears of a reporter on one of the dailies in some way; and he decided forthwith that there must be a story behind the incident and came to my office immediately, to run it to earth.

I happened to be out of town that day, but he found my wife at my desk, and taking it for granted that she was my private secretary, promptly stated his mission and got out his notebook.

Mrs. Thompson has little love for newspaper reporters; back in the years when we had lived at the mines they had come out to write up our strikes and explosions, and invariably they wrote things into their narratives that were misleading to say the least. At times they had even written things tending to lead outsiders to believe that we were a hard-hearted lot, concerned entirely with our own affairs with never a thought for the men whose lives were so completely in our hands. This unexpected chance to get even with one of the band appealed to my wife, and she promptly made the most of her opportunity.

Before beginning her narrative, Mrs. Thompson made the reporter promise that he would submit the proofs of his article to the president of our company for approval, before printing it, as the company had a positive rule that required all information for publication to be handled in that manner.

The story that my wife told the reporter ran something like this: A family in distress living in the city had tried in vain to get some coal from the office of the Associated Charities. Finally, by accident, the father of this family learned that the manager of our company had been his boss at a mining camp several years before (he was not a miner but had worked on one of the floating gangs) and remembering conditions at that camp he promptly appealed to him. Our manager was so impressed by the man's statement that he made a trip to the Associated Charities' office and was so shocked by the reports that were given to him there that he had persuaded his directors to make the contribution about which the reporter had learned. In commenting on the facts that he had picked up, the manager told his directors that it would appear that people living in cities were little concerned with the affairs of their less fortunate brothers.

The reporter took it all in and eagerly begged for more. He wanted to know all about the family that had formerly lived at the mines, how they had made a living there and what they were supposed to be doing now. Then he wanted to know about the president of our company, since he was to pass on the article. Was he fond of seeing his name in print, etc.?

No one but our president ever saw the article that the reporter wrote; that infuriated official (my but how he despised reporters) tore it into a thousand pieces before the reporter had time to realize that he had blundered. Then, as if to add insult to injury, the president ordered the young fellow out of his office without giving him a chance to ask for an explanation.

Fortunately, the managing editor of the paper was a close friend of our president, and when his reporter returned and gave an account of his adventure and asked for permission to give the "coal baron" the kind of write-up he deserved, the editor realized there was a "nigger in the wood pile" somewhere, and suggested that the reporter forget the incident and above all steer clear of private secretaries in the future.

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Contract Obligations

Although April is still some time off, the subject of renewing coal contracts is looming up. However, what is of greater interest, and a matter that is causing considerable discussion just now, is the question of the proportion of tonnage which the producer will deliver upon his contracts. It is something upon which both parties to the contract have decidedly differing views. The producer naturally intends to get off as easily as possible, while the consumer insists upon the full contract tonnage. A brief and candid examination of the respective claims of each is in order, as every question has two sides.

The amount of tonnage stipulated in the simplest and most prevalent form of contract is usually preceded by the word approximately. This phrasing, of course, is indefinite, and it is so understood by both parties. The consumer estimates his requirements for the year at a certain amount in round figures. It is his understanding that he is not obligated to take the full quantity so specified. The producer is in full concord with this interpretation. It is an unwritten understanding established by custom.

In practice it very rarely occurred that the consumer took the full quota he contracted for. He generally accepted as much as he could consistently take care of, and that settled the matter. No very serious objections were made by the producer, as he did not expect to make delivery of the total amount indicated. This undelivered portion was regarded as a sort of leeway to the consumer, something which would protect him in case of an unexpected demand upon his plant which would require an increase in his fuel supply. In no way was it inferred that it would protect the producer. Its only compensation to him lay in the fact that he might sell a little more tonnage than he anticipated.

Often, too, this approximate amount was increased as a personal favor to the salesman placing the contract, since it would make a better impression upon his superiors if he could show an increase. There really would not be any serious dispute if the consumer failed to accept the full delivery. A number of consumers can thank their good fortune that they increased their tonnages the past year at the earnest solicitations of eager salesmen, and are now probably faithful believers in the old adage that a good deed brings its own reward.

The matter of full contract delivery has now assumed a different aspect. Large producers estimate (and this conservatively, too) that they cannot deliver more than

75 per cent. of their contract obligations. It is possible, and probable, that some companies may deliver more than that percentage, but as an average 75 per cent. is quite fair and accurate. Nothing of this may have been intimated to the consumer, but he may readily confirm the statement by figuring up the total receipts to date and comparing them with the percentage of the contract amount he should have received.

The issue that now arises is this: Can the consumer in all fairness demand delivery of the full amount of tonnage stipulated in his contract? The producer answers in the negative, while the consumer as determinedly declares that he is entirely within his rights in demanding the full delivery. The producer bases his position upon several grounds, which, briefly summed up, are as follows:

First, that it has been humanly impossible for him to deliver the full amount on account of the unprecedented shortage of cars, the inability to get a sufficient supply of labor, the frequent and protracted embargoes on the various roads, and the extreme scarcity of vessels.

Second, that he is not morally obligated to ship the whole amount, unless it is so specifically stated in the contract, referring the consumer to past years when the latter accepted only from 70 to 95 per cent. of his obligations.

There can be no valid objections made to the first reason, and in the logic of the second there is much food for thought. It is only a trait of human nature that the consumer should be anxious to get the full benefit of his present low (in comparison with the ruling price of today) contract price, yet it is also natural that the producer should be equally as desirous of gaining by the increase in coal prices. He maintains that his obligations cease at the expiration of the contract, which, presumably, is Mar. 31, 1917, irrespective of the amount of tonnage delivered. If he were to ship the entire contract amount, it would take him anywhere from two to five months beyond March. This he does not feel warranted doing, in view of the sharp advance in prices.

He has already been compelled to go out in the open market on several occasions and purchase coal to meet particularly urgent contract obligations, owing to the lack of a sufficient supply of his own coal. The only way he can reimburse himself for the losses incurred in these purchases is to take advantage of the coming high contract prices. In the final analysis, the producer has not made such a huge profit as he is credited with. It is more wild speculation than anything else.

On the other hand, the consumer bases his whole position on the argument that he is morally and legally entitled to receive the full amount of tonnage his contract calls for; for if he does not receive it, what is the purpose of a contract at all? If the producer happens to have the worst end of the bargain, that is his misfortune.

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A Glossary of Mining Terms Is Now Being Prepared by the United States Bureau of Mines, the purpose being to avoid the confusion and uncertainty which is caused when terms of varying significance are used without definition. Van H. Manning at the American Mining Congress said that this glossary contained all available terms used in coal and metal mining, quarrying and metallurgical practice, geological terms as related to mining, names and definitions of the commoner useful minerals and terms used in the oil and gas industry. About 10,000 terms have been arranged alphabetically. The terms selected are now being verified by the use of older glossaries and new terms are steadily being added.

West Virginia Mining Institute

BY R. DAWSON HALL

SYNOPSIS—Good papers, lively discussion, a fair attendance and an interesting trip to Ashland induced the institute to determine against disbanding. The most interesting address was one by C. H. Tarleton on a recent mine fire and the means used to recover the mine affected.

On Dec. 12 the West Virginia Coal Mining Institute met at Huntington, W. Va., in the Hotel Frederick. There was a fair gathering and more persons would have been present if several meetings of operators in New York had not been scheduled for the same time, and if an Interstate Commerce Commission hearing had not drawn away some of the members. It was the old story of business proving too strong for the technical interest. Under the circumstances, however, the attendance was good.

The institute had planned to discuss a painless euthanasia and finally decided that there were still some good things in life and that they would try them for another year. They selected the leading doubter, Josiah Keeley, to galvanize matters into life during the next twelve months, and while he is not constitutionally hopeful, he is at least energetic, popular and influential and should manage to achieve something, for the industry is constantly getting larger, the communications more easy and the need for technical information more urgent.

The institute was greeted by E. Sehon, mayor of Huntington, and C. P. Snow, president of the Chamber of Commerce. The former deplored the fact that West Virginia sent so much of its raw material into other states and did not manufacture finished articles in West Virginia, using the coal of that state.

Reply was made by Josiah Keeley in the absence of the President, J. C. McKinley, who was detained by a mine fire. Mr. Keeley said he felt that it might be better if the superintendents of the mines would stay at home and send the mine foremen in their places. He thought every mine should have a representative.

A NEW KIND OF COAL MINING EFFICIENCY

C. H. Elsom, of Charleston, W. Va., then read an article on "Is Coal Mine Efficiency Engineering Justified?" but he discussed electricity only, and so the name of his paper was misleading. Probably there is no rule against calling expert electrical engineering "coal mine efficiency engineering," but the practice is not general nor is it one to be encouraged. Efficiency engineering has reference to routing of work, the human element and cost accounting. If it is to be regarded as synonymous with engineering, the term may as well be abolished, for all engineering should be efficient, whereas cost accounting, welfare work, physiology and routing are the tools by which engineering and business elements are merged into an efficient whole. Efficiency is the science of management, not the study of machinery. All of which is no criticism of the merits of the paper, which deserves commendation as a consideration of electrical problems.

H. H. Morris, of Huntington, read a paper on "Better Understanding and Relations Between the Mining Industry and the Railroads." He asked for increased

freight rates for his industry so that the transportation interests might be enabled to grapple with the severe necessities of abnormal demand and might be enabled to extend their lines where freight was demanding such extension. He also asked for proper consideration by the coal operator of the needs of the railroads. Managers, he said had a habit of noting cars as loaded before they were filled, thus creating difficulties for the railroad in making up its trains. He admitted that the railroads were not without their faults, declaring that the price paid for coal, about 65c. per ton, was not sufficient to meet all the expenses of production.

One might well have wished this paper read in some other state than West Virginia, for in that state the railroads, being mainly in the business of hauling coal, are making a fair profit. It is in other states where other products are carried in larger percentage on unprofitable schedules that the railroads most need relief. Coal pays more than its fair rate of freight and helps to carry the burden of the railroads. A few railroads of West Virginia with imperfect development of their resources are not doing any too well, but those that are doing all they can expect to do are prosperous and not in any need of commiseration.

WEST VIRGINIA'S PECULIAR GOOD FORTUNE

Consequently, the defense of the railroads by another member of the institute was not too favorably received. Especially were remarks as to the seasonal character of freight unfortunate, for West Virginia of all states is most favored in the regularity of the coal demand. The coal of West Virginia entering almost wholly into industrial service is in nearly equal demand winter and summer. The only variation is one arising out of periods of industrial activity alternating with periods of industrial depression.

In many ways conditions are exceptional in the Mountain State—and let it be added in eastern Pennsylvania also—but it is unreasonable to think the plea made was one for a readjustment of freight rates such as would put West Virginia at a disadvantage, as another member seemed to think. The arguments of Mr. Morris and his indorser were both based on broad national needs and on the necessities of West Virginia as a member of the Union, and were only to be so interpreted. As the second speaker stated, it cannot be denied that the railroads have not watered their stock as much as farmers have increased the valuation of their land; the statement cannot be traversed that the railroads have developed the land and the farmer largely despoiled it; nor that the farmer has sold his product even more generally than the railroad for all the traffic would bear.

If it is forbidden at a West Virginia gathering to bring up a national condition which does not have a local bearing, how then is it permissible to bring up the subsidies paid by the United States Government to trans-continental railroads, in which subsidies no West Virginia road has ever participated? These Government grants are not found after all to be so unreasonable by those who have noted that all these roads travel literally hundreds of miles between towns and that the towns

when reached are mainly railroad points existing not because they feed the railroad but because the railroad employs the workmen found in them.

I. C. White, the state geologist, agreed with Mr. Schon's remark that West Virginia should find a market for its coal in West Virginia rather than in other states. He said high freight rates might answer the purpose of an interstate protective tariff and promote that self-containedness in the state which he regarded as somewhat grievously lacking. He denied that West Virginia had inexhaustible resources. There were zones in West Virginia like that under Huntington where the coal was laid down in only limited quantity. Some areas 100 miles wide were almost entirely barren. At Huntington, for instance, the lower beds of coal were absent. The Pittsburgh coal was 300 ft. above the valley, but instead of being a bed of great value it was only about 3½ ft. thick. It was areas like this, bare spots in the West Virginia fields, which made the possibility of exhaustion or of serious depletion appear not so distant as some had attempted to prove.

STATE EXPERIMENTATION TO REMOVE WASTES

Dean Jones, of the University of West Virginia, urged that the state meet some of her wastes by experimentation. For this money should be provided. The proposed Newlands Experimental Station Bill No. 4874 would give the land-grant colleges \$15,000 a year for the development of the mechanic arts. The whole question relative to this bill is not as to whether it is a desirable measure, but as to who shall direct the spending of the money and as to the colleges where it shall be spent. The colleges which have not benefited from the land grants believe they should be favored when the new grants are made. They cannot see why institutions which have been built with large aids of the Federal Government and have been sustained in a measure under the Morrill and Hatch acts should carry off this further plum.

As far as West Virginia is concerned there is no rivalry. The grant could only go to the Morgantown institution and the Dean said he could only hope that a disagreement about the distribution and management of the fund would not prevent it from becoming available. He said the equipment at the university should be used not only for instruction but also for experiment. It may be added that in the closing session a vote was taken approving of the Newlands Bill.

In the afternoon the institute members went in two special street cars to Ashland, Ky., to see the byproduct plant of the Kentucky Solvay Coke Co. The weather was altogether too cold for the projected boat ride down the river to Ashland. There are 108 ovens at the Ashland plant 11 ft. high, 36 ft. long and 21 in. wide. The full charge is 15 tons, which is coked for 17 hr. Twelve tons of coke are pushed from the oven, three tons of volatile material having been volatilized or burned.

About 75 per cent. of the gas is used in the coking process and under the boilers, the rest is burned to waste. The coal used is about 2,100 tons per day. About 30 per cent. is low-volatile coal from the New River and the other fuel is from the Guyan and Elkhorn valleys. After the construction work is completed the force will be reduced to 350 men.

The coal is crushed before charging, so that 90 per cent. will pass through a ⅛-in. screen. As the ovens are

charged as soon as they are pushed and as there are hot ovens on either side maintaining the temperature at almost 1,600 deg. C., it seems a wonder that there is no violent explosion. The charging, however, is effected without anything other than a burst of flame and the emission of black smoke that lasts only a short time. The charge, which is pushed and leveled by different parts of one and the same machine, is soon leveled off and the coking process recommenced.

The coke on being pushed out of the end of the oven falls into a car and is immediately quenched. The car is made to travel along a conveyor on which it is discharged by the opening of side doors. A certain amount of froth-like carbon gathers on the top in the ovens during coking. This light material is of no value and is removed by hooks from the conveyor and thrown away. It is about 98 per cent. carbon.

In the evening the members were entertained at a banquet by the Huntington Chamber of Commerce. No speeches were delivered and the meeting closed early. All those who wanted oratory went to hear ex-Governor Hanley.

ARE LOSING OUR FORMER PRIDE OF WORK

In the morning of Wednesday, Dec. 13, Josiah H. Keeley delivered an address on "Efficiency in Its Relation to the Labor Shortage." He said that in America "pride of work" was fast being lost. The West Virginia farmer when he leaves the field for the mine says he is going to "work on public works" and regards it as bad form to get into a sweat at such labor.

Mr. Keeley said the nonunion mines had been quite generally raising wages. It was the intention, he understood, to lower these wages as soon as business became depressed. He doubted much if that could be done. He believed the higher level of wage at nonunion mines would continue after the causes which gave it birth had come to an end. He stated that to his mind a cut-throat labor competition was not to be differentiated morally from an unscrupulous competition for a neighbor's market. He tentatively advocated bonuses to encourage efficient operation.

W. E. Fohl, consulting engineer, of Pittsburgh, said that men who had a pride in their work might be taken from their working places and sent around to train other men in correct mining methods. J. T. Ryan said that this had been done at Gary, at the mines of the United States Coal and Coke Co. There also the stop watch had been used to see how much time was lost by reason of the delay in the delivery of cars at the miners' places. The men had also been taught how to use their picks and shovels.

Dean Jones said that some mines were meeting the high cost of living by maintaining at company stores the lower prices which were ruling before the increase occurred. The trouble with this plan arises from the fact that a store can hardly have two prices, one for its men and one for other men. As Mr. Keeley showed the companies around a plant which are not mining coal but are only temporarily in business are quite willing to raise the wages of the men they employ, as they will not have to pay them when times become less flush. These men coaxed away from the mines are apt to profit by artificial prices at the company stores as much as the miners whose wages have not been raised. Thus the coal company will

subsidize the looting of its working forces. The farmers also are likely to profit while selling their goods at bettered prices.

C. H. Tarleton, manager of the Consolidation Coal Co., West Virginia division, detailed the conditions obtaining at a fire which occurred on Sept. 16, 1916, at Monongah No. 6 (plant 43). Early one morning, soon after the men went into the mine, a fire occurred and the men began to come out, some being overcome by the gases from the conflagration. No one knew where the fire was. All they knew was that the men were coming out and were being overcome on the air return, that being the regular haulage and traveling way for the mine.

There are so many gas wells around the workings that it is not considered safe to use exhaust fans. Consequently, the air is forced in by the airways and returns by the roadways. The former headings are somewhat obstructed by falls and approach to the fire by them would be rendered difficult and slow. Though there were telephones, strange to say, they did not appear to have been in working order, so no information concerning conditions underground could be obtained.

Mr. Tarleton asked the institute what it would have done under the circumstances. Karl F. Schoew, of Huntington, advocated reversing the fan and J. T. Ryan, of Pittsburgh, formerly with the Bureau of Mines, urged that the ventilation should be slowed down just enough to prevent the possibility of the current being reversed by the heat of the fire. The fan was making 180,000 cu.ft. of air per minute.

REVERSED THE MINE FAN TO AVOID DISASTER

Mr. Tarleton said that the management thought that most of the men were on the befouled return and were feeling to the full the evil effects of the fire. The men who were better instructed, including the officials doubtless who were trying to subdue the fire, even on the intake. Their lives would be put in a degree of peril by a reversal of the air, but their intelligence being proved by the fact that they had crossed to the intake, it was wholly to be expected that they would recognize the changed condition and pass into the intake air when the ventilation was reversed. The men who had not taken in the situation but were hastening out by the regular roadways would be helped by the reversal and would, if still able, come out without difficulty. It was a difficult problem but it had to be met, and the management decided to reverse the fan.

By the reversal the rescue party was enabled to reach the third north face, a long face heading from which all the working headings debouched, the mouth of which was halfway to where the fire was ultimately found. Here the party, using closed lights, met with explosive gas halfway to the floor. The question arose whether it was safe to put this explosive gas over the fire.

Mr. Tarleton quite provokingly urged, what would you do? Frank Haas, consulting engineer for the Consolidation Coal Co., questioned whether the gas was really explosive. It had the content of methane, which gave a cap in the lamp, but it may well have had enough blackdamp in it to render it inexplorable. However, the party did not consider that theory. They reasoned that the gas had probably been over the fire once, as it had been liberated by the fire.

If it was dangerous it would have exploded then. However, returned with more fresh air it might develop

quite dangerous characteristics, though if moved back in bulk over the fire without admixture it might be quite harmless. It is true that the mine made gas—250,000 cu.ft. in 24 hr. The gas percentage normally ran about 0.2 per cent. Some one suggested that the percentage would go up somewhat as a result of reversal, the air traversing and then retraversing the workings, and being for some little while stagnant. However, that could hardly raise the percentage from 0.2 per cent. to a dangerous figure.

The management had to make some settlement of the problem. It had had some experience in such matters, for in two other conflagrations the passing of the gas over the fire had been satisfactorily attempted. Moreover the fire-fighting party within had probably short-circuited the air so that part of the air, at least, would avoid the fire area. This was found to be the fact. No evil results occurred from the passing of a large part of this explosive gas over the fire. The next question was whether to seal the intake or the return. Mr. Tarleton said he did not believe it practicable to seal the return first, in fact he assumed that the men who advocate closing the return first have never been up against a mine fire. The three returns could certainly not have been sealed without helmets. The one intake was sealed first, then the returns were closed one after another as they were approached from the intake, the intake air being used to aid in holding back the heated gas. Helmets were in use, but the best work seemed to be done with unhelmeted men. Mr.

Tarleton declared that the rules advocated by mine men in the past, relative especially to closing the return first in the case of a mine fire, needed revision. There will be, of course, much question as to his conclusions. There are mine fires of many kinds—slow combustions like those in French mines where even mudding of the seam may be resorted to; combustion as in metal mines where air plenum methods are used as a means of approach and the fire is directly attacked; anthracite fires which are stubborn but slow spreading and from which the gases created are not of a tarry character, and then there are fires like those in Pennsylvania bituminous mines which are not so severe as those in the West Virginia region. To show how dangerously subject West Virginia coal is to mine fires it may be added that Mr. Haas declared that some big corporations had about one fire a month, though most of these were insignificant.

Other critics of Mr. Tarleton's theories will say that owing to the fact that Mr. Tarleton desired to save the use of a chain of butt headings, by which it was proposed to provide for the future of the mine, he pushed



BADGES OF PARTICIPANTS

his brattices relatively close to the mine fire and so had to face conditions as fierce as any which could have been met. Still others will doubtless allege that the No. 43 workings were not highly gaseous and therefore work in them can be differently negotiated. They will be disposed to declare that Mr. Tarleton's solution may be suitable for Mr. Tarleton's conditions and not appropriate for all occasions.

Would anybody deny that the returns could have been shut off first had the fire been small or had the mouth of the third north face been taken as the point of bratticing. In Kansas, recently, pyrene was thrown on the flames several times in some hours. Surely in such a case the fire is so small that almost any plans can be compassed, if desirable, for conditions are somewhat different from those which Mr. Tarleton was considering.

AFTER ALL WHAT IS IT COMES FROM A MINE FIRE?

The cause of the fire is not known, but was possibly due to electricity, for there was a pump at a point near which the fire is known to have been located. The wires probably fell and the short-circuit ignited the coal. Mr. Haas declared that there were many mine fires which were caused by other agencies than electricity, though most of their fires were due to that cause.

It was not possible to avoid such occurrences by keeping electricity out of the mines. To make sure that there would be no fires, it would be necessary to keep the men out also. Mines could not be operated efficiently without electricity, and the only rational solution was to use the utmost care in installation, so that accidents would be as infrequent as possible. He said the idea that an after-damp consisting of oxygen, nitrogen, carbon dioxide and carbon monoxide did all the harm resulting from a mine fire was a grievous mistake. The effect on the kidneys and on the eyes continues long after the fire, and the smell can be noticed for long periods of time. A mixture of benzol and the lighter oils is in the air, and the effect of these is most harmful.

As some one remarked, there is a comparative immunity possessed by those who cover nose and mouth with a wet handkerchief. The power of water to absorb carbon monoxide is so limited that it must be a filtrative rather than an absorptive quality which the handkerchief possesses or, at least, something must be excluded which has a greater affinity for water than carbon monoxide.

After this address, Warren Roberts, of Chicago, read an article on "Latest Improvements in the Preparation of Bituminous Coal," which will appear in an early issue. In the afternoon, after it was decided to extend the life of the institute, Josiah Keeley was elected president and E. N. Zern, George Watson, J. H. Cabell, J. W. Bischoff and J. R. Cameron were elected as members of the executive committee. Karl F. Schoew, much protesting, was elected secretary-treasurer. The salesmen present proposed that the institute hold an exhibit and sell space to the manufacturers at the annual sessions. They desired the institute to aid the exhibitors by recognizing and managing the exhibit. This the institute agreed to do.

Karl F. Schoew acted as chairman of a symposium on "How May the Workmen's Compensation Law Best Operate To Effect a Reduction in Mine Accidents." This was opened by Mr. Smith, of the Associated Companies, who apparently had appropriated the convenient Wilson-Lee

paper, to which reference was made in the report of the West Virginia meeting. However, it is due both to Mr. Smith and Mr. Lee to say that they are both abundantly qualified to write equally able articles themselves. There was some discussion as to the characteristics of the Pennsylvania-Kentucky system and of the plan in force in West Virginia. None of the West Virginians seemed to realize how radically different the plans were.

Discussion then passed to difficulties under the West Virginia law. Mr. Tarleton wanted to know how money advanced to the afflicted beneficiaries under the workmen's compensation law can be refunded. Josiah Keeley said that in case of an accident the company was practically compelled to advance \$25 or \$30 to the family prior to that family receiving state aid. To refuse would be to receive the condemnation of the whole community. The check from the compensation board is sent to the coal company, and it sees that it is duly given to the beneficiary. At that time the manager or clerk can call attention to the debt outstanding and urge repayment, but if the recipient shows indifference as to his obligation there is no way in which such advances can be collected.

DIFFICULTIES IN WORKMEN'S COMPENSATION

J. H. Cabell said that the law did not differentiate between careful and wilfully careless behavior when accidents resulted. Two men were mining under roof which was "working." The foreman, when he entered the place, realized that it was not safe and ordered the men out. One man came out. The other man, realizing that not only the roof but the coal was "working," and that consequently it was easy to secure coal, stayed in the place, contrary to orders, and was killed. The first man meanwhile had been given a new place and was working in safety. No insurance was paid to the family of the man killed, because he was a foreigner; but Mr. Cabell resented the fact that the Carbon Coal Co.'s record was charged with a death which would have a bearing next year in making up the insurance rates. He held that the death was in no way chargeable to his company. He also knew of a case where a man deliberately made his accident draw a larger compensation than the accident warranted. A man hurt his leg severely and went to a surgeon who, by skillful treatment saved the man's leg. Somehow the man learned that if he had lost his leg, instead of \$350 compensation he would have obtained \$750, so he had the leg amputated by another surgeon and claimed the higher rate.

J. T. Ryan said that under the West Virginia rating two mines of identically the same physical condition might have vastly different rating, owing to a serious accident having occurred in one mine and not in the other. Based solely on a dead reckoning, the rate should be the same, though he did not believe in the entire disregard of the "experience" at a mine. To some extent the rating should recognize the past success or failure in circumventing accidents.

J. R. Brown, of Mansfield, Ohio, then read the same paper as was presented at the Louisville meeting, "Electric Haulage in Mines." H. D. James, of Charleston, W. Va., delivered an address on the "Synchronous Converter for Coal Mine Service," at the conclusion of which the meeting adjourned.

Profits Über Alles

BY BERTON BRALEY

Written Expressly for Coal Age

Now this is the story of Randall, the Solon from out of the West,
Who said to the Wise Men of Congress, "My brethren, methinks it is best
To start a new system of postage; the second class rate is too low ——"
"Let's cut out the franking!" said some one, but Randall protested, "Oh, no!
The frank is a privilege precious, forever fulfilling our needs
For sending out unspoken speeches, and mailing quintillions of seeds,
We cannot afford to forego it; but I have a far better way
To add to the Government's profits and help make the post office pay ——"

"I know," cried a Congressman, loudly, "your meaning is plain as can be,
You want to abolish the practice of sending the newspapers free
Which don't go outside of their county—believe me, I'm with you, old scout,
It's really a graft most expensive, I'll aid you in cutting it out,
To cease such a species of outlay will save quite a bundle of pelf ——"
"I don't want to stop it," said Randall, "I run such a paper myself!"

My plan is far simpler and cuter," he added in confident tones,
"We'll just soak the magazines harder by slicing the country in zones
And piling on postage for distance clear up to six pennies a pound,
Thus gaining some millions of dollars for Congress to scatter around
In post office buildings for Podunk—large buildings of costly design—
Or free distribution of papers—such papers, for instance, as mine.

"We'd drive many magazines bankrupt, we'd double the price of the rest,
We'd gather a tribute most heavy from people who live in the West,
We'd stir up old sectional feelings, on knowledge we'd levy a tax,
The publishing business would get it where chickens are given the axe,
But what do such little things matter? It's 'cash money' profits that count,
The people can go without reading if only the postal rates mount,
The technical journals can wither, the magazines all fade away,
That won't hurt my small county paper—so up with the postage, I say!"

Now this is the story of Randall, the Solon from out of the West,
And this is the innermost meaning of what he has tried to suggest,
He may not have said what is quoted, but if his new law is put through
The words we have rimingly noted will prove to be direfully true;
The spread of instruction is threatened, and if you won't want to allow
This drag on the progress of knowledge, just write to your Congressman,

NOW!

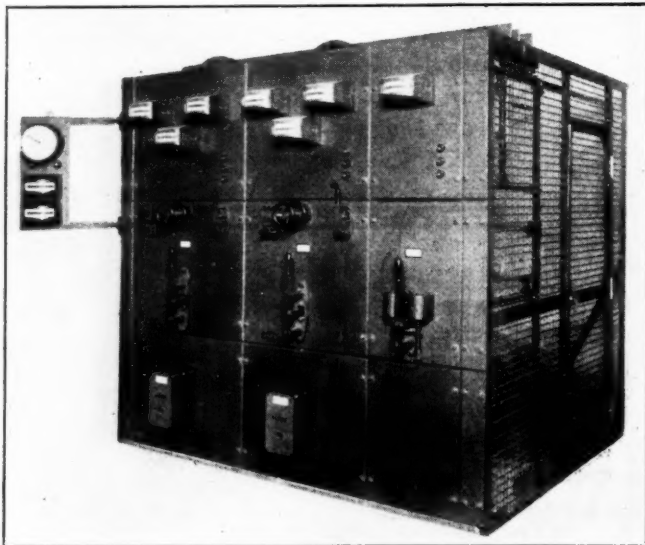
New Apparatus and Equipment

A Dead-Front Switchboard

Close coöperation between the manufacturers and the large users of electrical machinery has resulted in the development of many devices to safeguard life and property. A recent development of importance along this line is the switchboard shown in the accompanying illustration, which embodies several desirable features of safety and convenience.

All live parts, except current and potential receptacles, are inaccessible from the front of the board; and the live parts of these receptacles are recessed, so that accidental contact with them is difficult.

Grill work screens afford protection against accidental contact with live parts in the rear of the board. Hinged doors provided with spring locks are placed one on each



THE BOARD WITH ENCLOSED BACK

side of the grill work, making it impossible for anyone other than an authorized person holding the key to enter the space at the rear of the switchboard.

Disconnecting switches are used between all oil circuit breakers and busbars and provide convenient and rapid isolation of the breakers from the bus for inspection, changing oil or repairs, without hazard. Instead of the usual calibrating switches back of the panel, this board is equipped with front-of-board calibrating receptacles which permit safe and convenient calibration of instruments and meters from the front. Insertion of plugs in the calibrating receptacles connects the testing instrument in series with the instrument under test. The board is also equipped with removable fuse receptacles of the screw plug type, which provide for a replacement of secondary potential transformer fuses from the front of the switchboard without the danger of contact with live parts.

The live parts of the field switches are mounted on slate bases back of the panel and are connected to operating handles on the front of the board by rods and

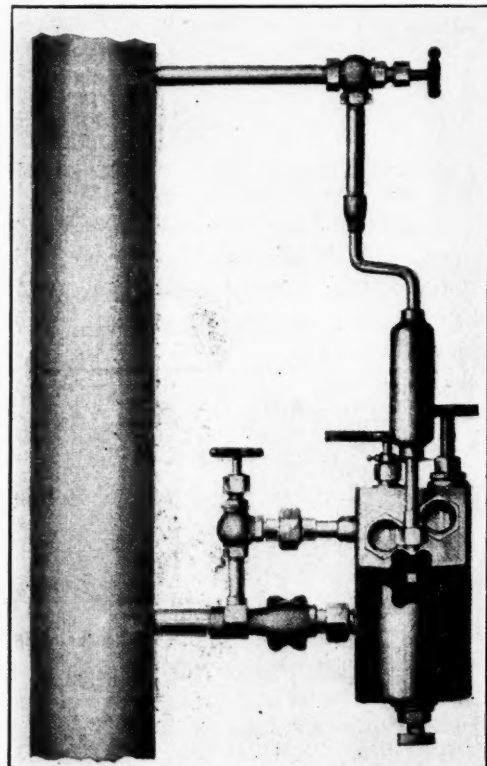
bellcranks. This method of mounting field switches is a development of importance and is strongly recommended, as it is impossible for the switchboard attendant to be injured by the arc or to come in contact with live parts of the switch when operating. Instruments and other adjacent equipment are likewise safe from damage by burning, which sometimes happens with the front-of-board type of field switch.

When switches are required for arc or incandescent circuits, the switches are of the dead front plug type. All live parts are back of the panels and cannot be touched from the front. This result is obtained by using two tubular receptacles and a two-point double-break switch plug per pole. The entrance bushings for receptacles are of molded material and extra large in size.

The panels described are for general power and lighting service up to 3,500 volts, 25 to 60 cycles, and are manufactured by the General Electric Co., of Schenectady, N. Y.

New Grease Lubricator

Another improvement in grease lubricators has recently been made by the Ohio Grease Co., of Loudonville, Ohio. The new lubricator is shown in the accompanying illustration.



LUBRICATOR AND ATTACHMENT

tration and is known as Class F. It is a drop-feed instrument, and differs from former models in the following points:

Steam for heating and atomizing purposes is taken from the delivery valve instead of from the lead line. A

new ball valve is used for delivery instead of the globe-valve type formerly employed. All valves are equipped with cool fiber wheels. Sight glasses in the feed chamber are of new design and extra heavy. The lead line may be of any length desired.

This lubricator is loaned by the maker for the exclusive use of Ohio cylinder grease. It keeps this grease hot, and divides a pound or pint of it into 22,000 tiny drops. It then superheats and expands each drop as it passes through the feed chamber, delivery valve, etc., and delivers it into the steam line in such condition that it is instantly atomized or vaporized.

Thus, it is claimed by the manufacturer, the passing steam is lubricated, and deposits a thin, uniform coating on everything with which it comes in contact. The amount of lubricant required is greatly reduced, and there is no surplus or waste to carry over with the exhaust. The system is in use on all sizes and classes of steam units, and the results obtained are proper lubrication and great economy.

✱

A Mechanical Analyzer for Carbon Dioxide

The need of a compact, accurate and quick analyzer for carbon dioxide has been met by the Bacharach Industrial Instrument Co., Pittsburgh, Penn., which has perfected the appliance here described. By its use 17 to 20 determinations may be made per hour by an inexperienced man within an accuracy of 2%. A solution of KOH in water is used as a reagent, and several hundred determinations can be made with one change. The instrument consists of a measuring tube *H* (in the illustration), a glass jar *F* containing the KOH solution and the metal connecting body *C*. Valves at *B* and *E* regulate the flow of the liquids. A sample of the air to be tested is taken, and the percentage of CO₂ is read directly from the calibrations on *F*, after the valves have been closed and the CO₂ subjected to the action of the KOH solution. This is accomplished by the entrance of water to replace the absorbed CO₂. The apparatus is most serviceable.—*Engineering and Mining Journal*.

✱

A Mechanical Credit File

The National Cash Register Co. has placed on the market a new device that will reduce to the minimum the work of keeping credit customers' accounts. For many years there has been an endeavor on the part of inventors to perfect some sort of a device that would adequately protect credit sales slip records so that the slips covering past accounts might not be lost or destroyed. It is interesting that the above firm, after perfecting a machine to protect cash sales, should now give to the business world this mechanical device which so completely protects charge records.

The N. C. R. credit file furnishes the maximum amount of speed in handling the credit transactions and

in addition provides a locked compartment for the storage of sales slips until the accounts are settled. Thus, the proprietor has complete control over his charge accounts. This locked compartment has a glass cover, constantly exposing to the view of the proprietor and employees the amount owing on each customer's account, but the records covering these accounts are only accessible to the one who has the key to the locked compartment.

A bell rings each time the file is operated and a number counter adds one each time the glass cover is closed. The entire file is made of steel and is as near fireproof as its construction will permit. Tests, made at the factory, subjected the file to a heat equal to that of an ordinary fire, resulting in no damage to the sales slip records it contained.

The protective features are as near complete as possible. The sales slips are placed in a daily file by the clerk or other person who has to do with the original credit transaction. This keeps each day's credit business separate from the previous days and furnishes the proprietor an absolute check on all these records.

At the end of the day the credit slips are transferred to the locked section of the file where they are accessible only to the proprietor of the business or someone to whom this responsibility has been designated.

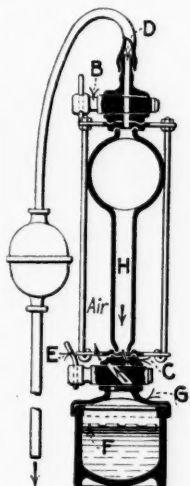
The files are made in two sizes, to accommodate the number of credit customers the merchant may have. They may be used singly or in units with equal convenience. They offer to the merchants of the world a protection on credit records parallel to that which the cash register offers on cash business.

Recent Legal Decisions

Taxation of Coal in Place—Under a deed from a coal company to land, reserving all coal in place and the right to maintain underground works for the removal of coal in other lands, but without right to remove the particular coal except for the purpose of constructing such works, on the owner of the surface paying the taxes against it, but not separate taxes assessed against the coal in place, the coal was properly sold to cover the unpaid taxes. The interest retained by the grantor in the deed was taxable. (*Raub vs. Lackawanna County*, 60 Pennsylvania Superior Court Reports, 462.)

Right to Damages for Eviction Under Mine Lease—In reversing a judgment for plaintiff in an action to recover damages for eviction under a coal lease, it is held that plaintiff must prove his loss with reasonable certainty, the jury not being permitted to conjecture. As a general rule, anticipated profits are too remote, speculative and dependent upon uncertainties to warrant a judgment for their loss. An exception to this rule is that loss of profits from the destruction or interruption of an established business may be recovered where it is made reasonably certain by definite proof what the amount of loss actually is. (*Oklahoma Supreme Court, Bray vs. Bokeshe Smokeless Coal Co.*, 155 Pacific Reporter, 226.)

Alabama Safety Regulations—The Alabama statute that requires conductors of electricity in shafts and slopes used as traveling ways and escape ways to be protected extends to a drift entry used as a place for a track and as a passageway for miners in going to and from the mine and in getting from one room to another, it being the only escape way from the mine. But the statute does not apply where only the opposite side of a track in an entry from where a trolley wire extends is set apart as a passage or escape way. Regardless of statute, however, a mining company is bound to see that a place that an employee is permitted to use as a way is kept in reasonably safe condition. So, if an entire entry be used as a passageway, and not merely one side of a track, the company may be held responsible for injury resulting from negligent failure to safeguard a dangerous electric wire. (*Alabama Supreme Court, Robinson vs. Maryland Coal and Coke Co.*, 72 Southern Reporter, 161.)



APPARATUS FOR
CO₂ DETERMINATION

Handling Mine Waters*

By L. B. SMITH†

SYNOPSIS—Water may enter a mine from the roof or floor. In either case it is frequently highly impregnated with acid. The amount of this water often varies widely with the season; consequently, a large pumping capacity must be provided even though this is not operated to the limit except in wet weather.

This paper will deal chiefly with the practical details of handling mine water, first, at the face and intermediate dips or swamps and, secondly, at the main sump and final discharge to the surface. A brief description is also given of the main pumping plants of the Morrisdale Coal Co.

Water in the mines usually comes either from the overhead strata or from the bottom of the coal. From the former source the greatest trouble is encountered, as the men will refuse to work in such places, especially when the water comes out of the roof in a rain of "droppers." It often happens that the overhead water follows along as the face advances, emerging from the roof close to the face. This condition can sometimes be remedied by putting small "pop" shots in the roof, at intervals, a short distance back from the face, liberating the water at these points and affording the men a much dryer place.

The water that springs from the bottom does not generally inconvenience the miner to any great extent if properly taken care of by the gathering pump.

PUMPS FOR USE AT THE WORKING FACE

For this work, the most rugged and simple type of pump should be used, as it will have to handle more or less grit and will often be running with the suction only partly submerged. It will also have to stand the knocks and bumps incident to frequent moving. In addition to this its operation will at times be left to the men at the working face, to start and stop as occasion demands. For these reasons, the pump should not only be of strong construction, but should have all gears and dangerous parts guarded. If electrically driven, an inclosed type of switch should be used. The ordinary type of direct-acting pump is best adapted for this service, owing to its simplicity.

The efficiency attained from a pump operating under these conditions will be much lower than from pumps operating at intermediate or local dips along the haulage, where the installations are of a more permanent nature and the duty more uniform.

Pumping at local dips between the face and the main sump is often unavoidable, but I have seen many such installations that were entirely unnecessary. In some cases the expenditure of a small sum in blowing down top in heading and air course, and filling in, or in doing a little ditching, would eliminate a pump and effect a large saving. In other cases the same object could be accomplished by building a small dam on the water course

at an elevation that would permit the water to be piped through the basin and over the rise beyond.

When pumps for this service must be used, almost as much care and thought should be devoted to their installation as to that of the main pumping plant, as failure at these points usually curtails the output; and if the pumps are located along the main haulage, their failure lays idle the entire mine.

The electrically-driven piston pump is best adapted for this work, especially when the capacity does not exceed 200 or 300 gal. per minute. The centrifugal pump has a relatively low efficiency in the smaller sizes.

In choosing the pump care should be taken to secure the proper size and to see that the water valves are not only of adequate size and area, but easily accessible. This latter feature is often lacking in small-sized reciprocating pumps, and as the water valves require constant attention, it is essential that the water-chamber construction permit of easy and quick access.

DIRECTIONS FOR THE LOCATING OF A PUMP

In installing the pump its location should be well up out of the water, in as dry a place as possible, especially if it is electrically driven. It should be easily accessible from some point on the haulage road. The suction lift should not exceed 18 ft., the end of the suction pipe should be well covered with water, and care should be taken to prevent air pockets in the line. Neither suction nor discharge line should ever be of smaller size than that demanded by the pump. In case the discharge line is of considerable length its size must often be increased to prevent the friction head from becoming abnormal. Two of the greatest evils prevalent at small pumping plants are "bushing the lines down" and the excessive use of tees and short elbows.

Conditions of this sort can easily be responsible for half of the power cost and together with careless attendance have caused many a good pump to be condemned.

Electric power is the most desirable for this service, as it is much more flexible and economical than compressed air. The steam pump, of course, is eliminated for isolated service. Alternating current should be used when available, as it has many advantages over the direct-current system, particularly where the latter must be tapped off from the haulage circuit, with its fluctuating voltage. When alternating current is used for small pumping stations, the voltage should not exceed 440, for safety precautions. All pump motors should be protected by having a no-voltage and overload release.

Where the mine workings are extensively advanced and the cover fairly shallow, the borehole and lead-covered cable can often be used for transmitting the power directly to the pumps with small line drop and a saving of copper.

Second and most important is the design of the main pumping plant. In the early development of a mine from which water must be pumped provision should be made for an adequate sump. This is of vital importance, almost as much so as the proper selection of the pumping equipment, for the success of a pump depends largely on the

*Paper read before the Coal Mining Institute of America, Pittsburgh, Penn., Dec. 6, 1916.

†Morrisdale Coal Co., Morrisdale, Penn.

plan of its suction branch and the quality of water it must handle.

Ample sump room allows the dirt and grit to settle. This, if permitted to enter the suction pipe in any great quantity, not only causes rapid corrosion and wear of the pump, but forms an ever growing scale in the pipe lines, increasing the friction head and power consumption and finally necessitating the tearing apart and cleaning of the lines. This is an abominably dirty and expensive job.

A further good preventive measure is to install a few small dams from 12 to 18 in. high, on the water courses near their entrance to the sump, at points convenient for cleaning out. These act as traps for the silt. It is surprising how quickly they will fill up.

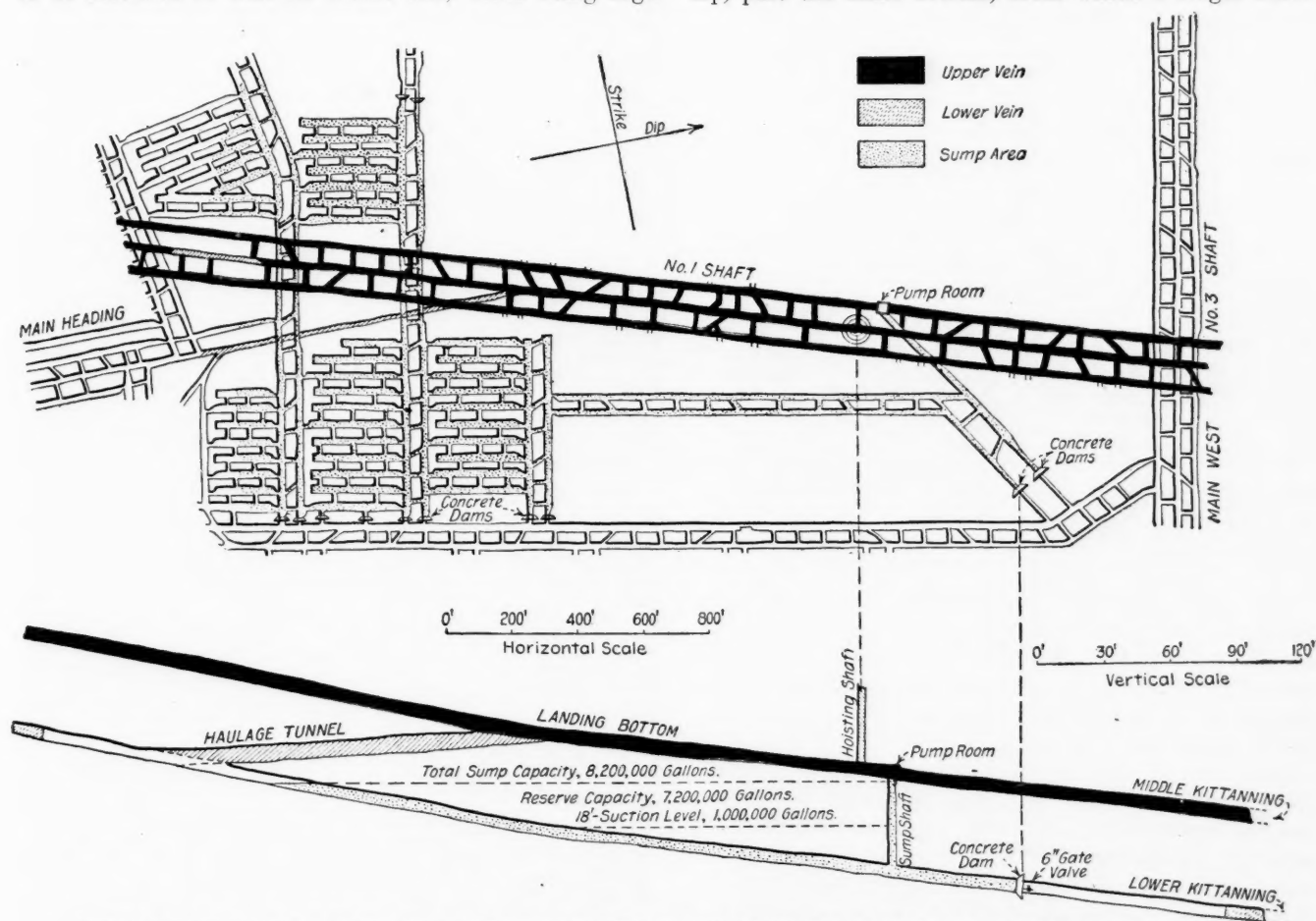
A large sump also usually permits the suction line to be installed so that its intake end, while being high

ties of water during the spring floods. The total amount of water pumped annually amounts to over 12 tons for each ton of coal produced.

The physical conditions at this mine afforded an opportunity for making an ideal sump. This is shown in the accompanying illustration.

Two coal beds are worked at this mine, the Middle and Lower Kittanning, with an interval of 40 ft. between and carrying from 150 to 400 ft. of cover. The shaft is only sunk to the upper bed, the coal from the lower seam being hauled through a rock tunnel and caged from the upper measure. A sump of about 1,000,000 gal. capacity was formerly maintained on this upper coal bed.

As the bulk of the mine water comes from the lower seam, it was decided to drive a pair of headings to the dip, past the shaft bottom, from which a single narrow



STORAGE ROOM OF LARGE CAPACITY PROVIDED BY IMPOUNDING WATER IN ROOMS AND HEADINGS OF LOWER VEIN

above the sediment on the bottom, will still be well covered with water, excluding air, which is injurious to any pump and lowers its efficiency. The suction intake of a large pump should always be at least 3 ft. under water, while 6 ft. will give better results.

Another and invaluable feature of a large sump is that of reserve capacity. This has often spelled the difference between the success and the failure of a mining plant. Reserve capacity pertains especially to those mines affected by the annual flood seasons, when at times the water enters the mine in equal volume to the total pumping capacity.

This is a condition prevalent at Shaft No. 1 of the Morrisdale Coal Co., where extensive mining has fractured the top strata at numerous points, letting in large quan-

ties of water during the spring floods. The total amount of water pumped annually amounts to over 12 tons for each ton of coal produced. A shaft was then put down, 40 ft. deep, connecting the two seams at this point, into which the suction lines of the pumps were introduced and carried to a depth of 22 ft. It was necessary to build several concrete dams at points where connection had been made to a haulage road, below the high water level, the maximum pressure on the lowest dam being 23 lb. per sq.in.

This sump affords a reserve capacity of approximately 7,200,000 gal. when pumped down to the 18-ft. suction level.

Steam pumps are used exclusively at this point, as the pump-house is located directly beneath the main power plant. The water ends of these pumps are maintained

by keeping the chambers lined with cement, which lasts from 6 to 12 mo., at the end of which time it is renewed. Thin spots in the casing are reinforced with babbitt. The valve seats and piston rods are also treated with a babbitt coating from time to time, which almost doubles the life of these parts.

If, in case of a prolonged wet season, the sump should overflow, a water course is provided to carry the surplus water to an equally large sump at the No. 3 Shaft, to which No. 1 is connected.

Here the water is handled by two double suction volute centrifugal pumps and a two-stage centrifugal. Each of these machines is of 1,700 gal. per min. capacity, and is driven by a 125-hp. 440-volt alternating-current induction motor. These pumps are constructed throughout of acid-resisting metal, the composition having been determined from analyses of the mine water.

Power is obtained through a borehole located at the pumproom, in which a lead-covered cable is suspended. This is connected to the transformers on the high-tension line directly over the borehole. The transmission lines are short, and the line drop is small.

EFFICIENCY GOOD IN SPITE OF ACIDITY

The operation of these pumps has been successful, giving a good over-all efficiency in spite of the acidity of the water. An analysis taken when the water was normal showed a content of 934 parts per million (54.5 grains per gallon) of sulphuric acid. Another analysis, when the water was rather high, was as follows:

	Parts per Million
Total solids at 212 deg. F.....	1,250
Loss at red heat.....	300
Oxides of iron and aluminum.....	290
Calcium oxide.....	87
Free sulphuric acid.....	105
Combined sulphuric acid.....	261

The repair cost for the centrifugal pumps per million gallons of water handled has been much less than that of the direct-acting pumps. They have been run from 18 to 24 hr. per day continuously for three months, during the flood seasons. When the water is normal one pump easily does the work.

Independent priming pipes are used, and the discharge lines have gate valves and branch outlets for draining out the water and relieving the pressure when the pumps are idle, which is essential for starting. They also permit the pumps to be emptied when not in use.

The water is discharged to the surface through boreholes, drilled 13 in. in diameter, in which 10-in. well casing was suspended and thoroughly grouted. Much of the casing has of course been eaten away by corrosion, but the cement filling will last indefinitely.

This method is more economical than maintaining a heavy cast-iron discharge line in the shaft.

It might be well to remark that in grouting the space between the wall of the borehole and the pipe great care must be taken if a permanent job is desired.

After the open space around the pipe has been calked at the roof line in the mine, a thin rich mixture of pure portland cement and water should be poured in from the surface. No sand should be used for at least the first 100 ft., as it will invariably settle to the bottom in spite of thorough mixing and cause leakage as soon as the casing is worn through. Where the water is extremely corrosive, it is advisable to use either a heavy joint

of brass pipe or a length of wood-lined cast-iron pipe, at the bottom, for connection to the pump discharge, allowing the upper end to run about 5 ft. up the borehole above the roof line. Care should also be taken to have the hole located where the mine roof is sound and free from slips, for if it springs a leak after being grouted, this is usually very difficult to stop.

The brief description of this pumping plant is cited chiefly for the reason that a difference of opinion exists among mine managers in regard to the use of the electrically driven centrifugal pump for handling mine water, many preferring the high-duty steam pump. Every pumping problem presents special features and conditions of its own, which should be the deciding influence in selecting the equipment.

Naturally, the first question that presents itself is the type of power to employ—steam or electricity.

It is safe to say that steam can rarely ever compete with electricity, especially if it must be carried underground any great distance. It is not unusual to find a drop of from 10 to 20 lb. in pressure between the boilers and the mine pumps, owing to condensation and leaks, which sometimes account for 30 per cent. of the steam consumed. The maintenance cost for steam transmission is also relatively high, labor being constantly required for repairing leaks.

Where central-station power can be purchased, a saving may often be made by shutting down the mine power plant, especially if the boiler-water supply is corrosive and unreliable. These are conditions existing at many small plants, and they entail high boiler repair cost and low efficiency, which means high power cost.

QUALITY OF WATER IS ALWAYS IMPORTANT

In deciding upon the kind of pump to install, the purchaser should remember that aside from proper construction and attendance, the mechanical success of either type hinges chiefly upon the amount of corrosive material contained in the mine water.

At some few of our mines water has been found containing over 1,200 grains of sulphuric acid per gallon. A condition of this kind calls for a reciprocating pump to be either lead, cement or wood lined. But where the water is reasonably low in acid, the centrifugal pump is well worth considering, as it has many points of merit, chief of which are low first cost, low cost of installation, maintenance, attendance and simplicity.

The most common complaint heard against the centrifugal pump is that its efficiency is low, but in actual practice in the mines this is usually counterbalanced by other conditions. Ultimate efficiency must include maintenance, interest and depreciation charges.

With the centrifugal type, the parts most subject to failure are the impellers, inner casings and bushing rings. These may have to be replaced as often as once a year, but this is also true of the valves, valve seats, stems, springs, etc., of the direct-acting type, which in the larger sizes, say from 1,000 to 2,000 gal. per min. capacity, usually cost from 50 to 100 per cent. more per set than the former, while the labor cost of replacement is equally high in proportion. Oil and packing expense is also in favor of the centrifugal type.

In making a recent comparison between a compound duplex pump and an electrically driven centrifugal pump, the machines differing but slightly in capacity and each

pumping approximately 300,000,000 gal. of water per year against a total head of 180 ft., I found that the difference in upkeep cost, including interest and depreciation charges, for a period of one year was \$630 in favor of the centrifugal pump.

This result has of course little relative importance outside of the two plants involved in the comparison, as there are probably other mines where the difference would be reversed. It proves, however, that guaranteed mechanical efficiency should not be the only guide in selecting a pump. It is essential that guarantees be secured as to the approximate life of those parts most subject to wear and replacement, and to ascertain their cost as closely as possible, in order that maintenance expense may be anticipated with reasonable accuracy.

After a pump is installed, tests should be made to check the guarantees, and especially the capacity. The capacity of a small pump can often be measured by displacement, which is very accurate; but with the larger sized pumps some other method must usually be employed.

The venturi meter and pitot tube are probably the most accurate means, but neither is well adapted for mine use. The rectangular weir will give sufficiently accurate results if proper care is exercised. The small cost of installing a good substantial weir at a point not far from the end of the discharge line will be amply repaid in permitting readings to be taken at regular intervals, by which a falling off in capacity can easily be detected.

Such a test is seldom ever performed at the mines, and it is safe to say that many pumping plants would receive more attention in their upkeep if occasional tests of this nature were made.

In conclusion there is one other point to consider in the handling of mine water. Keep it off the haulage and traveling ways. At how many mines is the visitor met at the entrance with the familiar question, "Have you a pair of gum boots?" I have seen thousands of dollars' worth of rails, switches, car irons, etc., thrown on the scrap heap, utterly ruined by the corrosive action of the mine water.

This also brings to mind the loss occasioned by inefficient haulage over sloppy, muddy roads, and the wrecks due to spreading rails, caused by the corrosion and eating away of the fishplates and spikes, and washing out of the road filling.

Practically the bulk of this loss represents unnecessary waste, which could be prevented if more care were exercised in attending to the simple details of handling the water.

Meeting of Rocky Mountain Coal Mining Institute

The next meeting of the Rocky Mountain Coal Mining Institute will be held Jan. 22-24, 1917, in Convention Hall of the Albany Hotel, Denver, Colo.

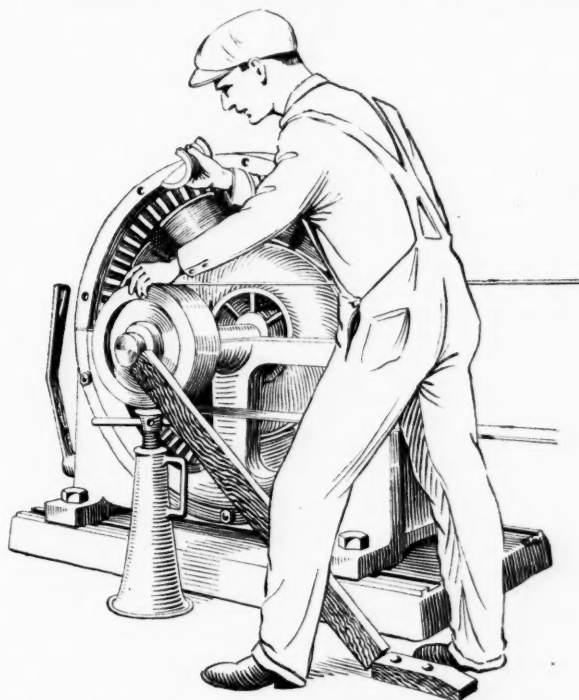
The following papers will be presented: "Methods of Working a 3-Ft. Seam of Coal Pitching 10 to 20 Degrees," by Samuel Dean; "Mine Fires," by Prof. J. C. Roberts; "Mine Ventilation and Its Application to Economical, Safe and Modern Mining," by D. D. Dodge, Joe Smith and Henry King. Officers for the ensuing year will be elected.

An interesting program is promised for the entertainment of those who attend the meeting. One evening will

be spent at the D. A. C. Athletic Tournament, where some good bouts will be pulled off; one evening will be spent at the Stock Show, where special arrangements have been made for the members of the Institute and its friends. A visit is contemplated to one or two of the mines north of Denver, and a trip will also be made to the power plant of the Denver Gas and Electric Co., or some similar installation. Other special features are also planned.

Removing Generator Bearing

E. M. Keys, Jr., suggests in a recent issue of *Power* that in order to remove the bearing from a generator or motor without disturbing the belt or rope, place a jack so



REMOVING TENSION FROM BEARING

as to support the weight and a brace or prop to take the belt strain, as shown in the illustration. Slack the tension screw back until the bearing is loose and it can be taken out.

COMING MEETINGS

Tenth Chicago Cement Show at Coliseum, Feb. 7 to 15, 1917. Secretary, B. F. Smith, 210 So. La Salle St., Chicago, Ill.

The Rocky Mountain Coal Mining Institute will hold its winter meeting at Denver, Colo., in the Convention Hall of the Albany Hotel, Jan. 22-24, 1917, beginning at 10 a.m. Secretary, F. W. Whiteside, Denver, Colo.

American Society of Civil Engineers will hold its annual meeting Jan. 17 and 18, 1917, at Society House, New York City. Secretary, Charles W. Hunt, New York.

The American Concrete Institute will hold its annual meeting at the Hotel La Salle, Chicago, Ill., Feb. 8-10, 1917. Secretary, Harold D. Hynds, 1418 Walnut St., Philadelphia, Penn.

Byproduct Coke Producers Association will hold its next meeting Jan. 12-13, 1917, in Milwaukee, Wis. Secretary, W. J. Lavelle, Boston, Mass.

Engineers Society of Northeastern Pennsylvania will hold its twentieth annual banquet on Thursday evening, Jan. 18, 1917, at 7 o'clock, at the Hotel Jermyn, Scranton, Penn. The cost per plate is \$3.50. Chairman of the Ticket Committee, A. E. Lister, Engineers' Club, Scranton, Penn.

The Labor Situation

General Labor Situation

The returns are gradually coming in after the recent international election. There seem to be no great surprises. Many of the old officials, from John P. White down appear to have been re-elected, though only the final count will tell the tale. John H. Walker, the president of the Illinois Federation of Labor, does, it is true, claim the presidency, though few seem to concede it to him. He declares that he has had victories in Illinois, Iowa, Indiana, Kansas, Missouri, Kentucky, Tennessee and West Virginia. But these roseate prognostications do not agree with the stories from those states. Thus West Virginia is said to have given 5 votes to John P. White to one for John H. Walker, and other states seem equally to favor the old John rather than his opponent.

This is remarkable, for there has been no little opposition to the recent agreement which the influence of the international board caused the men to sign. This opposition has grown in a sense more acute as the cost of living has increased and wages and bonuses have been given in nonunion industries. But meanwhile the mine workers have had time to reflect, and White's honesty of character and his high-minded leadership, have been borne in upon them; so, much as they feel troubled, they cannot blame White for what he has done.

The operators will have every reason to be glad if it shall be found that White will succeed himself. He has been square with them; he has fought for the observance of the contract with faithfulness, if not always with success; he has created a sentiment of acquiescence with the pledged word. Probably a popular campaign for re-election would have been one advocating a modification of the present contract.

It would have been easy then to have represented the international officers as up and doing. But White, seeking the suffrages of his fellow union men, stuck to the documents he had signed, coerced the obdurate, strengthened the resolution of the weak and refused for the sake of popularity to advance what he knew to be wrong. How many of our politicians would be as honest and as free from opportunism?

Now Mine Workers Try to Enjoin the Union

In the anthracite region local No. 1403, of Shenandoah, sought to have issued an injunction against John P. White, international president, James P. Matthews, district president, and other officials of the United Mine Workers, preventing them from expelling the local from the international organization for alleged illegal payments of dues during a strike in violation of the anthracite contract and contrary to union rules. On Dec. 19 Judge Koch, of Schuylkill County, refused to issue the injunction, declaring that the proper papers had not been served on the defendants. Local No. 1358, of Shenandoah, the largest in the miners' union, has begun a similar suit. The members are determined that this time the requirements of the court relative to service on the defendants shall be fully met.

At the last meeting of the seventh district of the United Mine Workers of America, held at Lansford, Penn., it was decided to favor the system of organization by which the men at any one colliery would form a separate local. Ballots are being distributed among the miners to find whether they favor this plan.

The "colliery local" is something new in the seventh district, and it is claimed that it makes it possible to secure more complete supervision of the union affairs. It is mysterious that according to reports, there are more buttons issued than dues paid. It is also said that many men dodge the payment of their dues by borrowing a button from a member at one colliery, when there is no inspection there, and wearing the button at another colliery on that same day. The new arrangement promises to keep these irregularities under closer surveillance.

As the convening of the state legislature approaches, the mine workers are elaborating the program for which they expect to lobby. Each of the two bituminous districts will send a delegate, and they will act with the three delegates from the three anthracite districts. More liberal provisions are desired in the compensation law. The mine workers want

the mine-inspector law changed, so that any mine foreman may be made eligible for the position of mine inspector without passing any further examination. Old-age pensions for men in and about the mines will be sought from the legislature. Counsel will assist the committee of district presidents in drafting the proposed enactments, which will then be submitted to the executive boards, after which they will be introduced in the legislature.

Last week we recorded the progress of the movement for a new contract in recognition of the increased cost of living, a higher price of coal and higher nonunion wages. The anthracite region has seen little of higher coal prices. Big companies like the Lehigh Coal and Navigation Co. have declined to increase their rates except insofar as they have rectified them to recoup themselves for the change in scale made in the spring. But despite this fact the outside men employed by that company have, through the union officials, petitioned for an increase in wages. They ask \$2 a day, which is the wage now being paid everywhere for unskilled labor. The company is giving the matter consideration—the reports even say "favorable consideration."

Rochester & Pittsburgh Men Want New Scale

Meantime another big bituminous concern, the Rochester & Pittsburgh Coal and Iron Co. and its affiliations, has had to face, not a request, but a demand from its 4,000 employees, who insist on a new scale. These brazen employees declare they never ratified the scale. What does it matter if they did not? The second district, after a referendum, ratified it, and they cannot refuse to be bound because they cast their individual votes in its disfavor. Otherwise, they would not be members of the union.

They want an 8-hr. day for all outside workers, with time and a half for overtime, an increase of 5c. a ton for all miners and extra compensation when certain classes of work are to be done. They also demand that where the company stipulates that electric lamps shall be worn, the company shall provide them without charge. B. M. Clark, assistant to the president, has refused to accede to these demands.

In the Pittsburgh district the likelihood of a strike among the union miners of district No. 5 seems to have been greatly reduced and what probability of such action there was seems to have been magnified by the district officials of the United Mine Workers in an effort to extract concessions of one sort or another from individual operators.

In the Canonsburg-Panhandle section some disgruntled radicals are trying to get 50 locals to sign a call for a district convention to demand some increases, but it is not thought the effort will be successful. The present cold and snowy weather is not propitious for the calling of a strike, and the mine workers' officials do not favor any such action.

Ohio State Will Meet to Consider Wage Rate

It may be well here to introduce the special convention of miners held on Dec. 22 at Glouster, Ohio. The mine officials declared that they did not propose a breach of contract, but they felt justified in asking, though not in demanding, an increase in wage to meet the increased cost of living, which they say has not only not been met with any increase but has been accompanied by an actual decrease, for the shortage of cars has caused a marked reduction in the mine workers' earnings.

The car shortage is still acute in the Sunday Creek district on the Toledo & Ohio Central and the Baltimore & Ohio railroads. The meeting, on the advice of the officers, who declared that the Hocking Valley could not raise wages without countervailing action elsewhere, decided to call a state convention which will be held at Columbus Jan. 9. At that session the new legislature may be asked by the miners' organization to probe the high cost of living.

The Somerset County situation is but little altered, though the number of men working at the mines affected by the strike is steadily increasing and the output of the mines is becoming larger. There has been some increased activity on the part of the United Mine Workers of America at Hooversville. As a result Judge W. H. Ruppel on Dec. 19 granted a process for the arrest of 20 or more of the striking miners. They will be asked to prove that the charge that they have violated the order of the court requiring them to desist from obstructing and annoying men working in the mines at

Hooversville is not true. What narrowly approached a riot among the miners occurred on the night of Saturday, Dec. 16.

In West Virginia, District No. 17, it is reported that C. A. F. Kenney, of Eskdale on Cabin Creek, has been elected president; William Petry, of Boomer, becomes vice-president; Fred Mooney, of Olcott, secretary-treasurer, and Pat F. Gatens, of Bancroft, member of the international board. These are all new men.

In the block coal district of Indiana, No. 8, James Kinney, of Perth, becomes president and James Foster, also of the same place, vice-president. Lawrence Bramlet, of Diamond, Ind., now occupies the presidency.

In the Illinois district unofficial returns indicate that Frank Farrington, of Streator, has probably been reelected, defeating James W. Murphy, of Westville. Duncan McDonald, who has been secretary-treasurer for 13 years, has probably been defeated, however, by Walter Nesbit, of Belleville. Farrington is expected to have a majority of the executive board favorable to his administration.

Unions Forbid Burning of Nonunion Fuel

Benjamin Bosse, the mayor of Evansville, Ind., has been endeavoring to reduce the price of coal in his city by supplying Kentucky coal at 9c. a bushel or 11c. delivered, the retail coal men charging 12 and 13c. This coal the miners' union has discovered came from nonunion mines, and the officials of the union have announced that any member of the union who is proved to have purchased the coal handled by Mayor Bosse will be fined.

During the last 30 days there have been upward of twenty strikes in the coal mines of Missouri, Kansas, Oklahoma and Arkansas, comprising the Southwestern Interstate district. This condition has undoubtedly contributed to the fuel scarcity which now prevails in Kansas City and vicinity, for it has meant the laying off for greater or less periods of time of hundreds of miners, with the consequent curtailment of output.

One ceaseless cause of friction between the operators and miners has been the insistence by the latter that whenever a miner is killed, or dies, or when a member of a miner's family dies, the mine by which he is employed shall shut down. While the operator is willing to close the working whenever there is a fatality at his mine, he does not feel that he should be compelled to lay off all his men when a relative of one of them dies who is not directly connected with the working of the property. He is willing, however, that any of the friends of the deceased who desire to do so may lay off, but he requires that the mine shall be kept in operation. This has been a long standing subject of dispute which the operators are endeavoring to solve:

Mine No. 4, at Hartford, Ark., was shut down for one week early in December owing to a dispute with the trapper boys, who resented the promotion of one of their number. The works of the Henryetta Mining Co. were shut down from Nov. 24 to Dec. 14, the mine workers striking because their committee was not present when the inspector made his examination of the mine workings.

The Fuse Prices Still Shut Down Coal Mines

The Clemens mine, of the company of the same name, Nos. 45 and 48 of the Central Coal and Coke Co., the mine of the Western Coal Mining Co. and that of the Young Coal Mining Co. were shut down for a period ranging from two to four weeks, when the miners struck to enforce a demand that, as in other mining fields, the price of fuse and wrapping paper for cartridges should not be increased. They demanded that the price prevailing last summer should continue in effect and urged that the Southwestern operators should stand the generally accepted loss, although the cost of these articles to the companies had increased 100 per cent. in the last 90 days.

The miners won their point, though the concession was made them under protest. The matter will be taken up for adjudication under the prevailing contract, although it is asserted by the operators that there is no contract provision governing that point. They further assert that should the point be allowed it would apply with equal force to food, clothing and all other commodities sold by the company stores.

One other point of acrimonious contact between the operators and miners has been the latter's demand that enough cars shall be actually under the tipples each morning to accommodate the output of the mine for one-quarter of a day's run. Should a less number be actually in place when the whistle blows the mine workers declare they will lay off for the day.

These are only a few of the causes of the strikes which have occurred in this district recently, and there is no doubt

that they have been contributory causes to the present coal shortage so severely felt throughout the Southwest region.

Prominent coal operators in Kansas have asked Governor Capper to note the difficulties of the coal companies which have prevented them from providing the coal supply demanded. They have called his attention to the many petty strikes and the suspension of work for what they regard as trivial reasons. They suggested that the governor or the legislature take some action, particularly near the Christmas holidays, to secure steadier production, for that is the one period in the year when the demand exceeds the output.

Governor Capper immediately addressed an open letter to the operators and mine workers, urging that holiday vacations be cut as short as possible and that the mines be kept running steadily every weekday except Christmas and New Year's Day. Some operators declare the appeal has been successful and that more mines are operating through the holidays than ever before.

Neill Makes Wage-Rate Sheet Paramount Evidence

Charles P. Neill, the official umpire of the Anthracite Conciliation Board, after long and careful consideration, recently reversed a decision made on Feb. 18 of the present year. In that first decision work, for which \$1.93 and \$2.04 yardage was paid, was to be compensated henceforth by payments of \$2.33 and \$2.47 respectively. The case was known as Grievance 314 "Certain Employees vs. Harwood Coal Co." This company is a subsidiary of the Lehigh Coal and Navigation Co.

In a more recent decision Umpire Neill dismisses the grievance of the Harwood miners and declares that the validity of the rate sheet of collieries will be held to be paramount and to establish a prima facie evidence of the rate at the mine for which the sheet has been filed. The party attacking the rate as thus listed must assume the burden of proof against it and the evidence against the rate sheet must be absolutely conclusive or it will not be accepted.

This seems a correct ruling and perfectly fair to both parties. The agreement requires that the rate sheet shall be filed. If individuals working for the company claim after its extended filing that another method of rating or another rating has been customary, they are certainly bound to substantiate their claims in the most definite way or have those claims denied.

It is clearly the duty of the mine workers to see that the rate sheet really harmonizes with the rates hitherto paid or agreed to be paid henceforth, and they do not do well if months after the rate sheet has been regarded as operative they bring up some concession, granted without knowledge of the company, or under some peculiar condition, and try to convert that unauthorized or peculiar concession into a rule of general acceptance overruling the authority of the rate sheet.

Not less is it necessary for the company which files the sheet to see that it truly represents the wage scale and to make sure that all the restrictions in its scope are made abundantly evident to the employees.

Umpire Neill took both companies and mine workers to task, declaring that oral arguments and briefs submitted to the umpire have contained statements which the testimony did not in any way support. He warned the litigants before his tribunal against making positive statements and failing to produce evidence to sustain them.

On Nov. 24 Umpire Neill decided the case of the Contract Miners vs. Lehigh Valley Coal Co. in favor of the latter. The case involved the rate paid for the presence of the "middle bone." The umpire said, "This is another case in which a rate has been found upon a rate sheet without anything to indicate or suggest that it was a special rate and not of general application to the entire colliery."

In the opinion of the umpire the company has proved conclusively that it was a special rate and that an agreement to that effect existed when the rate was filed. This conclusion is an exception to the general ruling by which the rate sheet is made of paramount obligation.

The Value of the Mineral Products of the United States in 1880 was \$364,900,000, according to the tenth census. In 1915, according to the advance figures of the United States Geological Survey, the product was \$2,373,000,000. From 1880 to 1915 the population of the United States increased about 100 per cent., whereas the value of its mineral production increased near seven-fold.—Van H. Manning at American Mining Congress.

Editorials

Public and Industrial Needs

The public is like a nervous old gentleman. Its reactions cannot be explained, except by recognizing first of all that it is like a neurotic person, far more troubled about manifestations and conditions than about remote causes. In its fussiness it cares more about removing annoyances than about the real evils which are injuring it. Being neurotic, the people, in dealing with concerns that perform for them notable services, show a testiness which makes it impossible for them to arrive at a remedy.

Let the public remember that the reason why it is so much angered at the producers of coal, beef and oil, and also of railroad and ship transportation and other like essentials of existence, is because these producers are such important factors in civilized life. Let it, however, also remember that to restrict the operations of these essential industries so severely as to reduce their power to accommodate the public, is sure to do more harm to the public's interest than to regulate their operation so that their work will be done efficiently and with reasonable cheapness and yet be sufficiently profitable to attract capital.

If the public seriously thinks that it will do well to drive all capital into ministering to luxury and indolence, if it conceives that it pays to discourage the railroad man and producer from putting his money into his industry, the public, thus grievously misled, must inevitably suffer from the fact that it has driven away or hampered its servants and must do without, or with less of, their necessary ministrations. The public will have large and flourishing motion-picture corporations, large theaters, impressive opera houses, speedy and sumptuous automobiles, but no productive industries.

It will throttle utilities for which it will not pay and secure nothing but frivolities for which it is willing to pay generously. Nor will it do better if it views as a matter of indifference the profits of those concerns which do not serve the public directly. Eventually, the public has to foot their bills and, consequently, they should equally be subjected to the censure of the people.

If we had no coal mines in America and had to buy our coal abroad, if we had no railroads and had to haul everything by wagons, if we had no lumbermen and had to import our timber, we should be quite willing to encourage the introduction of these industries by granting those who provided them a reasonable, even a large, profit. But what is true of establishing industries is true of maintaining them and developing them. Those which serve most should be most jealously conserved. The public benefactor is not he who adds most to the amusement or comfort of nations, but the man who does most to take care of its material needs.

Industries which do this should have the public's most cordial coöperation. It is true that the public should not allow the operation of such concerns to be conducted at any excessive profit, such as just now undoubtedly obtains in the bituminous-coal industry. But, conversely, the public

should not allow these prices to fall too distressingly low, so that waste of coal, waste of energy and waste of life will result, as indeed too often happens.

The public should take up the problem of such industries in a carefully considerate manner and grant them the power to coöperate in a way which will make these needful industries profitable and stable enterprises serving the interests of the public and realizing to the full their duty as producers of necessities.

It was interesting recently to see the larger anthracite retailers, many of whom are in no small degree representative of the larger anthracite producing companies whose coal they sell, conspiring with the mayor of New York to keep down prices to the small consumers. The persons who have been producing and distributing anthracite on a large scale have been hounded for years by every unscrupulous political interest from Presidents downward; they have been misrepresented in every possible way, but the public is beginning to learn that if they have by coöperation, legal or illegal, compelled the public to pay year in and year out a reasonable price for coal, they are prepared to accept their obligation not to charge undue prices when the demand makes such charges possible.

The large anthracite coal owners have the power to throttle the public, but have generously refrained from using it. The bituminous-coal industry does not ask for such powers as these. It is willing to be regulated in any way which will safeguard at once its own interest and that of the public.

E. N. Hurley, in his address before the American Mining Congress, praised the iron and steel corporations for the excellence of their cost-accounting methods. No doubt the anthracite operators are equally to be praised. They have careful systems of accounting which give them a clear knowledge of the costs of operation. But Hurley overlooked the fact that this type of bookkeeping comes only with fair prices, and that fair prices in an old and staple business come only with a coöperation, actual even if not in violation of the Sherman act.

It is such coöperation which is sought by the bituminous operators. It will enable the operating concerns to get a "living wage" and something more. No one can adequately define what that is with the workingman, for his wants increase with his wage; so his wage is always just a living wage be it large or small. But there is no question that a good wage has a wonderful effect on a man's self-respect and advancement as a producing unit.

In the case of a corporation there is a real "living wage"—not at all dependent on a corporation's desires. A corporation has a living wage when it gets as much for what it produces as it expends in that production. It should get something more than that, so that it can expand its business to meet the growing population and the enlarging needs of mankind.

It should be enough to encourage investment, so that capital would not be afraid to risk something in new methods of securing economies. A workingman who is

getting just enough to move along cannot raise a loan to take a course of study or take a day off to see or learn something. So an industry with its face ground by severe competitive conditions can risk nothing. It has no reserve balance to keep it from toppling over. So it is unduly conservative and there is no progress.

We have got to come to the rescue of our public utilities. They must neither fatten on us nor we on them. They need regulation badly. We are alternately falling on them and then they upon us. May we not hope that in Hurley we may find a Joseph who will stave off the lean years by conserving the generous product of those that are fat?

The public-utility corporations are getting extremely tired of the fact that the men whose service is not particularly essential or valuable to the community are continually hounding those without whose help they could not possibly live. The many-hued parasite is continually chiding the tree because the life sap it supplies is not of the quality and quantity it desires.

What the country needs to remember is that public utilities are not less than what they are named. If they are really useful, short sighted indeed will the public be if with foolish hand it stays their proper economic development; childish will it be if with lack of thought it fails to aid in advancing their legitimate interests.

§

Car Supply in the Middle West

The car supply situation in the Middle West if anything is growing worse, and that despite the vigorous action instituted by various state and federal commissions. The weather toward the close of last week assumed the proportions of a blizzard, greatly crippling the movement of coal, retarding the return of empties to the mines, and causing a flood of orders by telephone and mail.

The Indiana State Railroad Commission, which has been devoting a good deal of its attention recently to the car shortage question, has issued an order requiring a daily report from the railroads of the number of cars ordered by each mine, the number supplied, the number shipped, car numbers, consignees, and the number of cars held on track unbilled, as well as empties at each mine awaiting loading.

Indiana coal operators, at a meeting on Dec. 12 at Terre Haute, agreed to raise \$10,000 to carry on a fight to compel the railroads to furnish more cars to their mines. Owners of mines in Greene, Sullivan, Vermillion and Vigo Counties were informed by Secy. C. G. Hall, of the Indiana Coal Trade Bureau, that this amount would be needed to initiate a movement looking to a more satisfactory car supply.

The working time of the coal mines in the principal producing counties of Indiana was given in the report of November operations made public recently by Phil Penna, of the Indiana Coal Operators' Association. The average running time of all mines for 25 working days was 16¼ days, or almost two-thirds of the full time. Sixty-four days was the total for all mines, divided according to the different roads as follows: Southeastern line, 16.4; Vandalia, 16.7; C. & E. I., 15.6; Big Four, 15.6. These figures are approximate, or as nearly as could be compiled with the data at hand. Some mines, such as those on the Monon road, got more running time, but they were

so favored by advantageous facilities that it would not be fair to include them in the average.

The Interstate Commerce Commission's demurrage order is now in force, and it is expected to have a beneficial effect, owing to the heavy penalties specified for failure to unload cars promptly, though it will take some time to determine the results.

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South American Coal Markets To Be Investigated

An investigation of South American markets for coal will be undertaken at once by the Bureau of Foreign and Domestic Commerce, of the Department of Commerce. It is held that South America is the most logical market in the world for American coal and that a thriving business in that commodity will be an important factor in building up a merchant marine.

British economists are agreed that much of England's success in merchant shipping is owing to the fact that Welsh coal has always been available for return cargoes. The need of such a return cargo has often been felt in our South American trade.

Latin America is a promising market for coal because it has limited supplies of its own. Chile, Peru and Bolivia in particular need coal and have an abundance of minerals to ship in return. Nitrates and iron, copper and tin ore can be brought to this country more cheaply if full cargoes of coal can be taken back on the return voyage.

The investigation will be undertaken by Special Agent Grosvenor M. Jones, who has written several important reports for the bureau on shipping problems. Mr. Jones has been engaged for some time on preliminary work and will start for South America about the middle of January.

The promising outlook for a large export trade in coal in 1916 did not materialize. Shipments to foreign countries, Canada excepted, were 20 per cent. less this year than in 1915. Our large coal-producing companies have not given the right kind of attention to supplying foreign markets. South America now takes 2,000,000 tons of our bituminous, as compared with 500,000 tons before the war. Let us coöperate with the Government officials who are endeavoring to foster this business and make these exports three or four times what they are now.

§

A trade paper is what its readers make it. The value of a technical publication is in direct proportion to the amount of good that can be taken out of it. Not only are *Coal Age* readers benefited by the subject matter presented in its pages each week, but the opportunity is afforded of getting still more good out of the paper—and that by contributing articles to go into it.

The different departments of *Coal Age* offer unlimited scope for the presentation of matter that will be of interest and value to those engaged in the coal-producing industry.

New methods of mining, of timbering, of haulage; welfare work, housing, sanitation; accident prevention, safety devices, safety rules; all these and more are subjects that offer to the observant miner pleasant work for the coming winter evenings.

Sit down tonight and write your first article. *Coal Age* pays well for all contributions that are accepted.

Discussion by Readers

Seasonal Mine Explosions

Letter No. 4—As the winter season is now prevailing, the warning given by J. W. Powell, *Coal Age*, Sept. 16, p. 458, in respect to the liability of explosions occurring in mines at this time more than in other seasons of the year, should not be disregarded.

It is the duty of everyone employed underground to avoid mistakes and dangerous practices that might lead to an explosion of gas or dust. This caution does not apply to miners alone; in many cases, the management is responsible for practices that involve much risk. Many mines generating quantities of gas are worked with mixed lights, which are always a source of danger when the mine should be worked exclusively with safety lamps.

Referring to Bulletin 115, of the Bureau of Mines, Table 44, pp. 69-73, shows that, out of a total of 237 coal-mine accidents causing the death of five or more men, in the years from 1895 to 1915, inclusive, there were 160 explosions of gas and dust, or 14.8 per cent. The 237 accidents recorded in this period of 21 years show a total of 6,308 men killed, while the 160 gas and dust explosions, included in that number of accidents, resulted in the loss of 5,246 lives, or 83.1 per cent. of the total number of fatalities.

The accompanying table, which is compiled from Table 44 of Bulletin 115, to which I have referred, shows the

or even explosions that are the direct result of a fire occurring in the mines, of which there were several during the period mentioned; namely, the Pocahontas, Va., fire and explosion, Nov. 14, 1901, causing the loss of nine lives; the Ziegler, Ill., fire and explosion, Jan. 10, 1909, twenty-six lives; the Victor-American No. 3, Delagua, Colo., Nov. 8, 1910, seventy-nine lives. But, where the explosion was followed by a fire it has been included, as in the Hanna, Wyo., mine explosion and fire, June 30, 1903, causing a loss of 169 lives.

Summarizing these explosions and the number of persons killed, as tabulated here, gives the following averages for each season, during this entire period.

	Explosions	Per Cent.	Men Killed	Per Cent.
Spring (March-May).....	49	30.6	1,805	34.4
Summer (June-August).....	17	10.6	475	9.1
Fall (September-November).....	39	24.4	953	18.1
Winter (December-February).....	55	34.4	2,013	38.4
Totals.....	160	100.0	5,246	100.0

It is only natural to expect a larger number of explosions to occur in the colder months of the year, beginning with October and extending through the following May. Not only is the drying out of the mine largely responsible for this result, as has already been explained by other writers, but the mines are run, during this period of eight months of the year, under a much greater pressure. More men are employed in these eight months

NUMBER OF GAS AND DUST EXPLOSIONS AND FATALITIES FOR EACH MONTH AND YEAR 1895-1915

	January		February		March		April		May		June		July		August		September		October		November		December		Totals		
Year	E	K	E	K	E	K	E	K	E	K	E	K	E	K	E	K	E	K	E	K	E	K	E	K	E	K	
1895			2	29	1	60	1	23											1	7			2	67	7	186	
1896			1	49	1	13													1	6			1	7	4	75	
1897	1	5			1	14											1	12							3	31	
1898																	1	8							1	8	
1899			1	5			1	5	1	23			1	5									2	50	6	88	
1900					1	46			1	200											1	7			3	253	
1901									2	30	1	19					1	6	2	28					6	83	
1902	1	20			2	21			1	184			1	112	1	13	2	23	1	11	1	7			10	391	
1903					1	5	1	6			1	169									2	28			5	208	
1904	1	179					1	5											1	19			1	17	4	220	
1905			2	114	2	33	3	75											1	5	2	14	1	18	11	259	
1906	2	40	3	49	1	23	1	18							1	6			3	52					11	188	
1907	2	108	1	25	2	18	1	7	1	16	1	7											5	701	13	882	
1908	1	9	1	9	1	59			1	12											1	154	1	50	6	293	
1909	3	78	1	16	2	14					1	21	1	9					3	33			2	15	13	186	
1910	2	82	3	52	2	13	2	55	1	83								1	56	3	27	1	8	15	376		
1911	1	5	1	17	1	5	2	151	1	5			1	21				1	8	2	26	1	84	11	322		
1912	3	17			2	154	1	5			1	12	2	16	1	18								10	222		
1913			1	5			1	96	1	15					1	19		1	263	1	24	1	37	7	459		
1914	1	12					1	181									1	7	2	68				5	268		
1915			2	34	1	112	1	11	1	9			1	9	1	19					2	54			9	248	
Totals.....	18	555	19	404	21	590	17	638	11	577	5	228	7	172	5	75	6	56	18	556	15	341	18	1,054	160	5,246	
Per cent.....	11.3	10.5	11.9	7.7	13.1	11.2	10.5	12.1	6.9	11.0	3.1	4.3	4.4	3.3	3.1	1.4	3.8	1.1	11.3	10.5	9.4	6.5	11.3	20.1			
Note—Explosions denoted by E; number of men killed, by K.																											

Note—Explosions denoted by E; number of men killed, by K.

number of explosions of gas or dust and the number of persons killed thereby in each month, from Jan. 1, 1895, to Dec. 31, 1915. The table also shows the total number of explosions and the total number of men killed in each month, during the entire period, and the percentage of explosions and fatalities for each month, during the same period. In the right-hand column of the table are shown the total number of explosions and total number of fatalities resulting from such explosions, for each year, from 1895 to 1915, inclusive.

It should be observed that the explosions listed here do not include such accidents as blownout or windy shots,

than during the remaining four, and a larger output of coal is produced.

The rush and drive natural to these conditions will generally be accompanied by less care and caution on the part of the men employed underground. Not only this, but a larger amount of dust is produced in the operation of the mine, a larger surface of coal exposed and more gas generated during these months. It is therefore important that mine inspectors and all mine workers should try, in every way possible, to avoid these dread occurrences and caution men against them.

Peru, Ill.

GASTON LIBIEZ.

Coal-Mining Examinations

Letter No. 9—I cannot agree with John H. Wiley, when he argues in favor of asking candidates for mine foremen's certificates to answer questions that, as he says, "involve a working knowledge of mining equipment," *Coal Age*, Dec. 2, p. 939. Allow me to say that I have been through the mill and have had practical experience in all branches of work in and around coal mines and, as a mine foreman, feel that my practical and theoretical knowledge of different kinds of mining machinery and equipment will compare favorably with that of the average foreman.

While I freely admit that a competent foreman must be thoroughly familiar with up-to-date mining methods, and ready to meet any emergency that may arise in the mine, I beg to state that the examinations for certificates of competency, under the present mining code, must be largely concerned in ascertaining what a candidate knows in respect to the safe operation of mines and keeping them in a condition that will promote the health and welfare of the employees. The law is not concerned, at the present time, with questions relating to the capacity of the mines or the output of coal or cost of production. For this reason, it would seem that the first duty of an examining board is to follow the line marked out by the law and ascertain a candidate's capability to manage a mine in compliance with the law's requirements.

If this is true, the kind of questions suggested by Mr. Wiley, regarding a working knowledge of mining equipment, would be out of place, while questions relating to the safe operation of mining machines and other equipment would be more in keeping with the law.

Clymer, Penn.

MINE FOREMAN.

Letter No. 10—Referring to the letter of John H. Wiley, *Coal Age*, Dec. 2, p. 939, in which he criticizes my attitude in respect to the knowledge that a mine foreman should possess in regard to mining machinery and equipment, I do not want to be understood as preferring a purely theoretical examination to a practical one. Had that been the character of the questions asked when I sat in examination, my chances of securing a certificate would have been slim indeed. It was probably my lack of clearness that caused Mr. Wiley to misunderstand the meaning of what I said in respect to examination questions relating to the operation of mining machines.

To explain briefly, like Mr. Wiley, I think that a mine foreman should know something about machines. His knowledge of their care and operation should be sufficient to enable him to select men that are capable of running such machines. It would not reflect much credit on a mine foreman to put a man in charge of a machine who would allow it to run hot and not know how to remedy the trouble.

There is all the difference in the world between knowing something of a machine and being able to pass an examination on one. I have been wondering how many mine foremen there are who have ever laid a 60-lb. switch themselves. At the same time, I should not think much of a foreman if he was unable to tell whether such a switch was properly laid by the trackmen in his employ.

I believe that a mine foreman will show his ability more by employing men who can properly perform the

various kinds of work required in a mine, than by proving that he is capable of doing the same work himself. A foreman is not hired to do the work in a mine, but to see that it is properly done by the men whom he employs.

To a certain extent, I did ridicule the asking of this style of questions, but it was not because I considered that mine foremen should not know something about them. It was rather because I think there are questions of greater importance relating to the safe, economical and successful operation of a mine. In my opinion, a mine foreman's examination should be such as will show a man's intelligence and knowledge of practical and theoretical mining.

However, after he has passed the examination and secured his certificate, a foreman will find his greatest asset will consist in his ability to handle men and this, like many other things in mining, can only come from experience. I hope I may be pardoned for writing a second letter on this subject.

THOMAS HOGARTH.

Heilwood, Penn.

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Textbooks in Examination

Letter No. 5—I was glad to see this subject opened for discussion in *Coal Age*, as I believe it will be of great benefit to many practical miners who are ambitious to improve their condition. The applicant for a certificate of competency must do a lot of studying before he can understand a mining textbook so that he can rightly apply the rules and formulas given for the solution of different problems.

In my opinion, the use of textbooks by candidates in examination, when answering technical questions, will in no way reduce the standard of efficiency or detract from the qualifications of those candidates who are successful in obtaining the required mark. I believe that the applicant who can grab a textbook, properly apply its rules and formulas, work out a mathematical solution and obtain the correct answer to a problem gives undoubted evidence of his ability to handle such questions as they arise in mining practice. The oral examination, together with the time a candidate has been employed in coal mining, and the character of his experience will show his practical ability to fill the position he desires.

DIFFICULTIES THAT HANDICAP THE AVERAGE PRACTICAL MINER

It is well known that the average miner rarely thinks of the examination, until he is out of his teens and is married and has a home and family to support. Those responsibilities make it harder for him to memorize the rules and formulas that are required in the solution of technical questions in mining.

Speaking from my own experience, I may say that few practical miners have had the benefit of an early school education, which makes it difficult for them to compete successfully in an examination in which technical questions are asked. After studying a full-mining course in the Scranton Correspondence Schools, and reading mining journals and textbooks for 20 years, I found that I could not even then memorize the rules and formulas that would be required in an examination.

It is not strange that I failed to receive a passing mark in my first examination, but I am proud to say

that I have since passed seven such examinations, in three different states. At all these examinations I would have found a textbook a great help, and I am satisfied it would have in no way impaired my desire for knowledge and further study. But, the use of a textbook in those examinations would have enabled me to obtain much higher marks.

Permit me to say that I can see no reason for not permitting a man to use his textbook, in answering technical questions in an examination, the same as he does in daily practice in the mine and the office. The man who has done little studying in preparing himself for examination will not be able to use a textbook rightly if given one, and his use of a wrong formula or constant in the solution of a problem would disqualify him.

On the other hand, a candidate deprived of his textbook must depend on his memory alone, which will fail him in many instances; but this failure to remember the right formula or constant should not disqualify him in examination, because in practice he would refer to his textbook for the necessary formula or constant and would seldom trust his memory. It cannot be denied that the use of textbooks in examination would be fair to all candidates alike.

In closing, let me state what has already been suggested, that the examination could be arranged so that all technical questions requiring mathematical work, formulas and constants, would be asked in one or more sessions when textbooks would be allowed. Other sessions could be devoted wholly to practical questions designed to show the candidate's practical knowledge and experience in mines, and in these sessions no textbooks would be used. I am strongly in favor of allowing candidates the same use of their textbooks as they enjoy in daily practice.

Shelburn, Ind.

R. J. PICKETT,
Mine Superintendent.

Mine Accident Record

Letter No. 1—I notice that the news item regarding the recent accident at Nanticoke, as published in *Coal Age*, Dec. 9, p. 985, states that "two men were killed and another injured so badly that he will probably die, by a mysterious explosion that occurred at 7:30 p.m., Dec. 1, at a new shaft that is being sunk at the Loomis colliery of the Delaware, Lackawanna & Western R.R. Co."

Evidently, the *Coal Age* correspondent is not acquainted with the previous history of this shaft, since it is not "a new shaft," but one that was sunk 50 years ago. Neither was there anything "mysterious" about the explosion, which was only what might have been expected by one acquainted with the conditions under which the work was being performed. Whether known or unknown, there is always a cause preceding the effect. Allow me, in a few words, to explain what was the cause of this "mysterious explosion," at the old Dundee shaft, now known as Loomis No. 4, operated by the Lackawanna Railroad Coal-Mining Department.

As I have just stated, the shaft had been sunk 50 years previous and when abandoned, later, was filled with culm. Only recently it had been decided to reopen the shaft by excavating the culm, which had settled down in a solid mass. It was necessary to shear the sides and ends of the old shaft, the workmen standing on the culm that filled the shaft.

When the work had proceeded to some depth, a force fan was set up to blow air to the bottom of the shaft, through a pipe probably 2x3 ft. in section. The circulation thus afforded, however, was not sufficient to remove the gas and dust from the bottom of the excavation, and electric lights were employed in the shaft to avoid the possibility of igniting the gas and dust. It is quite probable that under these conditions the ignition of the gas and dust was either caused by the explosion of a charge of dynamite or by a spark from the electric wires.

This is only another instance where greater caution is needed in the execution of work under the dangerous conditions common to coal mining. Unfortunately, a suggestion that might avoid a possible accident, when made by an experienced workman, is not generally received kindly or taken seriously by the boss in charge, and the lives of the men in his care are often endangered. Until mine officials and their men come closer together, such avoidable accidents must continue to happen.

Nanticoke, Penn.

W. A. BARRETT.

Boost Rescue Work

Letter No. 1—Attention has been drawn, in the timely discussion of "Seasonal Explosions," in *Coal Age*, to the fact that the present cold season brings with it increased liability to mine explosions. This has been painfully illustrated by the two recent mine explosions that have occurred in a single month, in Alabama.

The constant recurrence of these disasters, which seem to be almost inevitable, emphasizes the crying necessity for the improvement of mine-rescue methods and equipment. It should be remembered that any criticism or suggestion here offered carries with it no reflection on the great work accomplished by the Federal Bureau of Mines, which is largely responsible for the high standard already established. There is, however, no halting place in human progress, and it will generally be admitted that organized mine-rescue work is entirely inadequate to meet present needs.

To even the casual observer, one of the chief obstacles to prompt effective rescue work, in the event of a mine explosion, is the lack of proper equipment and a sufficient number of trained men who are competent to undertake the task of rescue, which at the best is an extreme hazard. Could this work be done within an hour after an explosion has occurred, instead of waiting five, eight or ten hours for the arrival of a rescue car, or trained men from a distant colliery or rescue station, there would not be the great loss of life that so frequently occurs by reason of the long delay in rendering aid to those entombed underground.

ORGANIZED STATE MINE RESCUE WORK

Happily, several coal-mining states are leading the way in efficient organization, by establishing and maintaining effective rescue stations at many central points throughout their coal districts. Other states, however, must seek and obtain Federal aid for this work.

The need of more organized effort and better equipment is most obvious to those who have participated in the work of rescue following a great explosion in a mine. The subject is one worthy of most careful consideration by mining men, not only because human lives are precious and property valuable, but because industrial economy

calls for the adoption of every practicable means to avoid these destructive agencies that engender lawsuits and increase liability-insurance rates.

I hope to see this question of a more thorough organization that will develop trained men and needed equipment at convenient distances in every coal-mining state thoroughly discussed in *Coal Age*. I believe it is time that the rank and file of the coal-mining industry do their part to carry on the great work that now rests so largely on the Federal Bureau of Mines. WILLIAM CROOKS.

Kimberly, Ala.

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Bonus System in Mining

Letter No. 8—Speaking of the bonus system in coal mining, I agree with the writer of *Letter No. 3, Coal Age*, Dec. 2, p. 939, whose experience along this line is evidently very similar to my own. His remarks, in respect to the tendency that a bonus offered to a motorman has to cause accidents by reason of undue haste and disregard of safety, recalls a bonus episode for which I was responsible when in charge of a certain mine. The story runs as follows:

We had made an excellent run up to noon, and everything looked promising for a record that day. As the big motor was leaving for its first trip after dinner, I said to the motorman, "Red, if you can set a new record today, I'll make it right with you." Back came the answer, "I'll do it or take a wheel off," for the motorman was as enthused as myself with regard to the possible record run.

Upon entering the big side track, after finishing my daily rounds, about 2 p.m., I said to the switch boy, "Well, lad, how is Red doing this afternoon?" "Fine," said the boy; "he's gone for his fourth trip and he sure is wheeling 'em since dinner." This was two trips better than the average for that time of day. But, as transpired later, it was Red's last trip for that shift and came near being his last for all time.

ACCIDENT DUE TO OFFER OF A BONUS

Resting for a moment on the side track, my mental estimate of the possible output for the day was suddenly interrupted by the "snapper," who came on the run, shouting to the kid as he neared the switch, "Where's the boss, boy?" Breathless with haste, he exclaimed as he reached me, "Red is piled up at the mouth of 16 Butt and there are lots of night men in the trip with him." As may be imagined, it did not take me long to reach the scene of the accident and, to my surprise, I found that none of the men were badly hurt, except the motorman, who had been thrown out, striking his head against the rib.

While my bonus offer that day did not break any record, it did break up 16 cars so that they were in condition to have the irons burned off. It was a miracle that there were not half a dozen men good subjects for the undertaker. Thirty yards of track were torn up, and the big motor went to the shop for a week.

However, I do not wish to be understood as condemning the bonus system altogether. Personally, I approve of the offering of a bonus where it will not induce men to disregard safety. The offering of a bonus to a motorman for every ton of coal hauled over a certain amount; or to a miner for every ton produced above a given

figure; or to a foreman for a week's or a month's record run is to court a loss rather than an increase of dividends and is, in effect, a gamble on human life, since every man concerned then thinks only of the possible reward.

In some of the larger mines, miners are paid a certain percentage over their wages for employing safety methods and keeping their place in a safe condition, as reported by the safety inspector. At the same time, the foremen and other officials are correspondingly rewarded for an improvement in the nonaccident record for the month or the year and the safe condition of the mine inside and out and the discipline maintained. Such companies have come to realize the fact that accident prevention promotes efficiency and consequently output. Such a bonus system is a credit to any employer, while the other is "a sheep in a wolf's skin."

Houston, Penn.

EXPERIENCE.

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Reward of Long Service

Letter No. 4—The question propounded by "Dee," *Coal Age*, Nov. 4, p. 116, is one that will not only arouse great interest but will appeal strongly to those who, like myself, have been through the mill. It must be admitted that the situation he has described is not an uncommon one in the coal-mining industry.

In my own experience, I settled the question with some satisfaction to myself at the time, by getting out of the company. Later, however, I regretted my hasty action, although it is quite probable I would do the same thing again, under similar circumstances.

It must be admitted that personal ties and the circumstances of a man's environments and obligations give the question quite a varied aspect. A young man, with no ties to bind him to the place, if he has the proper ambition and self-regard, will look quite differently on the matter of making a change than a married man who is settled in the place and has a family dependent upon his income. Again, I believe there are many able mining men holding inferior positions, who are naturally of modest disposition and retiring. Such men hesitate to proclaim their own abilities and are often distanced in the race by fellows of lesser qualifications.

THINK BEFORE YOU JUMP

Now, it is difficult to advise in the case mentioned by "Dee," as the attendant circumstances are not stated. However, in a general way, a man, young or old, should make no jump in the dark. He should never resign, hoping and expecting that his resignation would bring the company to terms, for nine cases out of ten his hope will not be realized. Desiring to make a change, a man should look up another place and satisfy himself that it offers suitable advantages over his present position.

When making a change, under such circumstances as described by "Dee," it is unnecessary that an employee consider the convenience of a company that has not given him due consideration. Loyalty of an employee to his employer is a splendid quality in a man, but such loyalty must be engendered in an employee by a like loyalty of his employer to him. It is a case of reciprocity. Too often has it happened that an employee has injured his own chances of advancement, because of his high regard

of loyalty to those whom he has served faithfully, when it is evident the company has not shown the same loyalty to the man.

Whenever a company is prone to give evasive answers to an employee, who has done satisfactory work that has been acknowledged, it is quite clear that they are anxious to secure the greatest service for the least remuneration, and are not actuated by the principle of giving an adequate return for service rendered. Such a disposition in a company, displayed toward an employee, is a bad sign, and an employee cannot be blamed for looking elsewhere and seeking employment where promises mean something more than empty words.

But, however unsatisfactory the treatment received, it is never best for an employee to urge his claim to recognition too strenuously, since a company will often find a way of quietly getting rid of such a man as being "objectionable." It must be remembered that there are more ways of "sacking" a man than coolly dismissing him from service.

REASON FOR DESIRING A CHANGE

When seeking another opening, a man should never complain of his present place, but make his appeal solely on the strength of his ability. If a reason is asked for his desire to make a change, he should reply that there appears to be little opportunity for advancement and say no more. This may be advice that is hard to follow, because it is human nature to expose an injustice. It is better, however, that the unjust treatment should be discovered through other channels, and the injured one will stand higher in the estimation of all who know why he desired a change.

An employer, on the other hand, should remember that a seeming injustice to an employee, when unexplained, makes it difficult for the man to show the same interest in his work. A candid explanation and a heart-to-heart talk will in most cases bridge over the necessity that a company is often compelled to face of seeming to disregard the rights of an employee who is disappointed and his ambition crushed.

EMPLOYEE.

Sydney, N. S.



Shortage of Labor in Mining

Letter No. 16—It seems from the several letters on this subject that have already appeared in *Coal Age*, that the labor question is causing much anxiety to coal operators and mine officials. Not only are they worried over the shortage of labor that prevails in some mining districts, but many are alarmed at the present unrest and dissatisfied condition of a large class of the miners. The problem of holding men in the mines seems to be, in some cases, as difficult of solution as that of securing new recruits to fill the places of men that are shifting from one place to another.

Kindly allow me to suggest a few important things to be considered in order to hold men in their places. Steady employment is one of the chief factors. Idle days do more than almost anything else to cause men to hunt other places, unless it is the absence of good houses to live in, where the miner can make a home for himself and family.

The better class of miners want houses, not shanties, and I am sorry to say that many mining towns can

boast of nothing better, in the way of living accommodations, than a lot of undesirable shanties where the inmates exist but do not live. It is good to see, however, that a large number of up-to-date mining companies today realize that good houses invite and retain a better class of miners. It is found that men are willing to pay a reasonable rent for a good home rather than to be forced to exist in a shanty at a far less rental. The surroundings of the latter place may often be unhealthful and the place itself unfit for habitation.

Again, experience has taught me that miners want their houses near the mines so that they will not be compelled to travel a long distance in cold or wet weather when going to work or returning home. It is not an uncommon experience for a miner's clothing to be frozen to his body when he arrives at the mine or reaches home after a long tramp through rain and sleet.

In my opinion, conditions in the mine have really less to do with the wages that a man can make than the treatment he receives from the mine officials. I never go into a miner's place myself that I do not inquire whether the motorman or driver is giving him all the empty cars he can fill; or, if the machineman is cutting enough coal for the loaders; and observe whether he has ample supplies of timber for making his place safe. When a miner complains that his switch is in bad condition, I examine it carefully before telling him that it is all right. In brief, I always make sure that a man is getting all that is coming to him and never offer him an extra dollar or give him more time than is his honest right.

A FOREMAN'S CONSIDERATION FOR HIS MINERS

I never allow a man to wait two or three days when he has finished a place, before giving him another. Indeed, I let him know a day or so beforehand where his next place will be, so that he will have plenty of time to see what he needs in change of tools or check number. I never allow a motorman, driver or company man to give orders to a miner, or boss them in any way. The men understand that they get their orders from me or one of my assistants.

Should I find, as the case may happen, an assistant has given a man wrong instructions in regard to his work, I take the matter up with the assistant but never say anything to the man myself. This allows the assistant to correct his own mistake and gives the miner greater confidence in him than if I interfered and countermanded his orders.

Miners like to get to work at an early hour when paid on a tonnage basis. I find this condition is the same in union and nonunion mines. About 33 per cent. of the miners take advantage of an early start so as to get through early and get out of the mine. Where it has been necessary to haul the men into the mine, I have given orders to give them a man-trip at 4, 5 or 6 o'clock as wanted, in addition to the regular trip at 7 o'clock.

Following along these lines has kept me well supplied with men and, during my nine years' experience as foreman at different mines, employing from 50 to 700 men, no one can say that I have ever been short of men to operate the mines and produce the desired output. From my observation it is the man that can put good thoughts into action who is successful in producing results.

Clymer, Penn.

J. O. SEESE.

Inquiries of General Interest

Electric Substations in Mines

Kindly permit me to ask through the columns of *Coal Age* a question that has an important bearing on both safety and economy in the operation of a coal mine. I would like to get the opinion of practical mining men in regard to the advisability of establishing an electrical substation underground. Would the establishment of a substation in a gaseous mine introduce an element of danger, provided the station was located on the main intake airway where a good current of fresh air is passing continually? If such a substation is to be located underground, what precautions should be taken in conducting a current of 2,300 volts down the shaft and through the mine entries to the underground substation?

—, Ill.

MINE MANAGER.

[We hope that this inquiry will receive due attention and call out the expressions of opinion from the many mine electricians who are readers of *Coal Age*.—Editor.]

Gas Wells in Coal Fields

I have been not a little surprised to find that the Pennsylvania Mining Law contains scarcely any provision relating to the sinking of gas wells in coal fields. In view of the seriousness of the situation, which is a growing menace in some districts of the state, and inasmuch as the same danger exists in the mining districts of other states, I want to ask if it would not be well to have this question thoroughly discussed in the columns of *Coal Age*.

There is a strong feeling in certain sections that some publicity, in respect to the danger to life and property that is likely to develop, owing to the increasing number of gas wells in mining districts, would have a good effect to regulate and control this practice. Many of these wells are drilled through the workings of active coal mines at the present time and, in some cases, are producing gas under heavy pressure.

I believe that a discussion of this subject would result in many good suggestions being made, in respect to measures that can be taken, legal or otherwise, that will safeguard mine workers and mining companies and reduce to a minimum the dangers arising from this source.

Irwin, Penn.

PENNSYLVANIA OFFICIAL.

What this correspondent has said, in reference to the absence of any specific provision for the regulation and control of the sinking of gas and oil wells in mining districts, is true, as is also the suggestion that the publicity given by a discussion of this important mining problem would have a good effect in safeguarding the coal-mining industry.

The coal-mining laws of Ohio and Illinois provide specifically for the regulation and control of gas and oil wells sunk through the coal measures. There is no question but that the unrestrained practice of drilling such

wells through coal measures is an unmitigated evil, whether there are mines in active operation at the time of sinking the wells or not. This question was treated to a considerable extent in *Coal Age* some years ago, and one or two good letters (Vol. 1, p. 1255; Vol. 3, p. 157) appeared and a few articles on the subject.

We shall be glad to have the views of *Coal Age* readers in the hope of drawing the attention of legislators and mining men in general to the menace such practice is to the mining of coal.

Recovering a Flooded Mine

I would like to ask, through the columns of *Coal Age*, for the suggestions and advice of those who have had experience in unwatering a flooded mine. The proposition that I have in mind at the present time relates to a mine that was abandoned some 20 years ago. The mine was opened by a slope pitching nearly 45 deg. The coal has an average cover of 125 ft., the roof of the seam being a hard slate, while the floor is a compact fireclay.

It has occurred to me that, this mine being full of water, which would practically exclude the air, the pressure of the water would assist to support the roof and make it possible that the present condition of the workings would not be found as bad as might be expected, if the water was to be pumped from the mine. I will say that the mine when abandoned was practically new and in good condition.

When the expense of sinking a new slope and developing another mine to the extent of this one is considered, it appears to me that it might be cheaper to pump out the old mine and clean it up, provided it is reasonable to expect the workings are not badly caved.

I do not expect that anyone can tell the condition in which this mine will be found, but I am sure that there are many practical men who have had experience of a similar nature and can give me the benefit of their advice and suggestions as to the possible or even probable condition underground, in the present case. I shall very much appreciate hearing from such persons.

Gebo, Wyo.

T. S. ALMOND.

[Here is an excellent opportunity for the giving of practical mining advice. Many abandoned mines have been recovered, after being flooded for a period of years, and found to be in fairly good condition. We regret that this correspondent has not given more exact information, stating the thickness of the coal and the extent to which the workings have been developed.

It may be assumed, however, since this mine was a new mine when abandoned, that no pillars have been drawn. Had there been any extensive caving of the roof, it is probable that the resulting effects would be in evidence on the surface, since the cover is said not to exceed an average of 125 ft. We hope there will be a ready response to this inquiry.—Editor.]

Examination Questions

Mine Bosses' Examination in Indiana, September, 1916

(Selected Questions)

Ques.—(a) With motor haulage how would you protect the trolley wire to prevent accidents from the same on the main haulage road? (b) What system would you establish to govern motor haulage and what kind of markers would you use? (c) How would you arrange motor and wire to prevent placing the trolley wire across room-necks where trolley motors are used for gathering purposes?

Ans.—(a) The trolley wire should be firmly supported on good insulated hangers and, as far as practicable, it should be carried along on one side of the road. Where men are obliged to travel the haulage road, the trolley wire should be on the side opposite to that left for the men to travel. At all places where men or animals must cross the main haulage road, the trolley wire should be raised to a height that will permit them to pass under it safely and, to further prevent their contact with the wire, it should be guarded by sideboards extending along each side of the wire the full width of the crossing. The sideboards should project from 3 to 4 in. below the wire and should not be more than 6 in. apart. There should be a suitable danger signal at all such places, warning men of the presence of the live wire.

(b) Where two or more motors are employed in a mine, hauling coal from different districts to the shaft or slope bottom or to the tippie, a fixed schedule should be arranged and agreed upon by the motormen, such that it would be practically impossible for a collision to take place between two trips. Under no condition should a motor be permitted to run out of a cross-entry onto the main road without first stopping and the motorman making sure that the way is clear.

The same rule should apply to a motorman hauling coal on the main road and approaching a cross-entry. The motor should be stopped to make sure that a trip is not coming out of that entry. Some would prefer to give the motorman hauling on the main road the right of way, but the safer plan is for him to at least have his trip under full control at the mouth of each pair of cross-entries to avoid a possible collision.

In addition it is always safer where more than one motor is employed in a mine to arrange a double track on the main road so that the ingoing empty trip will not interfere with an outcoming loaded trip. Where this is not practicable, an absolute signal system should be arranged that would give the right of way, on a single section, to but one motorman at a time. The best marker for use is a light hung on the rear end of a trip of cars. An automatic gong is sometimes employed for the same purpose, the movement of the car ringing the gong, but this is silent, should a trip come to a standstill.

(c) The trolley wire should always be hung on the side of the entry opposite to the rooms. In a few cases where this is impracticable, motors having two trolley

poles have been used, so as to allow a change of the trolley wire to the opposite side of the entry when necessary. There are instances where the trolley wire is carried in the center of the entry, but this is always attended with danger to men and animals traveling on the road.

Ques.—If you were mine boss, what orders would you give the timbermen in regard to making themselves safe when timbering an entry where the roof was very bad?

Ans.—Instruct the men to proceed with caution in all cases, sound the roof and make a careful inspection to discover any slips or joints in the strata. Before attempting to take down a dangerous piece of top slate, it may be necessary to set one or more temporary posts as a protection against an unexpected fall. Where a broken set of timbers is to be removed, it will generally be necessary to stand a new set in place before disturbing the old timbers.

Ques.—In the event of an explosion, how would you proceed with the rescue work, and what orders would you give to men in your charge?

Ans.—Much will depend on the character of the explosion and its results; but, in general, without the use of breathing apparatus, no advance must be made ahead of the fresh air current. Only safety lamps must be used by the rescuers, who must be organized under a competent leader and obey his orders. Where breathing apparatus is available, the men so equipped should advance only a safe distance ahead of the men making repairs to doors and stoppings to reestablish the air current. Another force of men must be employed to supply the needed material to those making the repairs. The men should be instructed to keep cool, talk little and obey the orders of their leader.

Ques.—How many tons of coal in a 5-acre block if the seam is 6 ft. in thickness, assuming there are 27 cu.ft. in one ton and allowing 20 per cent. off for waste?

Ans.—There are 43,560 sq.ft. in an acre. The cubic contents of a flat seam 6 ft. in thickness and underlying 5 acres of land is therefore $5 \times 6 \times 43,560 = 1,306,800$ cu.ft. Making an allowance of 20 per cent. for waste, the net contents of this seam is $1,306,800 \times 0.80 = 1,045,440$ cu.ft. On a basis of 27 cu.ft. per ton, the weight of coal underlying this acreage is therefore $1,045,440 \div 27 = 38,720$ tons.

Ques.—If one pump can handle a certain amount of water in 12 hr., while another pump can do the same work in 9 hr., and another in 7 hr., how long will it take the three pumps to do the work, all operating at the same time?

Ans.—The first pump will handle $\frac{1}{12}$ of the water in 1 hr.; the second pump, $\frac{1}{9}$ in 1 hr.; and the third, $\frac{1}{7}$ in 1 hr. The three pumps working together will therefore handle $\frac{1}{12} + \frac{1}{9} + \frac{1}{7} = \frac{85}{252}$ of the water in a single hour. The time required to handle the whole or

$\frac{252}{85}$ and to complete the work will then be $252 \div 85 = 252 \div 85 = 3$ hr., provided each pump does its share.

Coal and Coke News

Washington, D. C.

A favorable report has been filed with the Senate from the Committee on Indian Affairs on the bill introduced this month by Senator Gronna, relating to the disposal of coal and mineral deposits in Indian lands. The bill, as favorably reported, reads:

"That where the coal or other minerals contained in any lands embraced in any Indian reservation which have been opened to settlement and entry, or shall hereafter be opened to settlement and entry, have been reserved from disposition, the reservation of such coal and other minerals shall inure to the benefit of the Indian tribe or tribes to whom such Indian reservation belonged, and all proceeds arising from the disposal of such coal or mineral deposits as may be determined by law shall be deposited in the Treasury of the United States and shall be applied in the same manner as the proceeds derived from the disposal of the lands contained in the reservation within which such coal or mineral deposits are located."

A favorable report has also been filed with the Senate by the Committee on Indian Affairs on the bill introduced by Senator Owen this month, which authorizes the Secretary of the Interior to extend the time for payment of the deferred installments due to the purchase of tracts of the surface of the segregated coal and asphalt lands of the Choctaw and Chickasaw tribes in Oklahoma. As reported to the Senate, the bill reads:

"That the Secretary of the Interior is hereby authorized to extend the time for payment of the final installment due on the purchase of tracts of the surface of the segregated coal and asphalt land area belonging to the Choctaw and Chickasaw tribes, sold under the act of Congress approved Feb. 19, 1912 (37th Statutes at Large, page 67), to four years after the sale was made instead of two years as provided in section five of the said act: Provided, That the accrued interest on all installments to date when due and the principal of the second installment, if due, shall be paid before an extension as herein provided may be granted: And provided further, That in all other respects the provisions of existing law shall apply to these purchases."

Conference Between Carriers and Shippers

A conference between the Committee on Car Service of the American Railway Association and representatives of shippers and receivers of freight and the Interstate Commerce Commission was held here recently to consider tariff changes proposed by the carriers affecting reconsignment, free time and other practices which have relation to the detention of cars.

At this conference a memorandum was offered by the representatives of the railroads proposing changes in diversion and reconsigning regulations on carload freight in cars. It was explained that these revised regulations had been adopted at a general conference of traffic representatives of the railroads operating in the territories of the following traffic associations: Trunk Line Association, Central Freight Association, New England Freight Association, Western Trunk Line Committee, Southwestern Traffic Committee, Southeastern Freight Association, Southeastern Mississippi Valley Association, and the Trans-Continental Freight Bureau, held shortly prior to the open conference with the public.

It was then explained that the adoption of these rules and changes upon anthracite coal in Trunk Line and Central Freight Association territories is subject to advice from carriers not in attendance at the original conference. No fear was expressed but that the changes would be universally adopted by the railroads provided the Commission decided them to be reasonable under the circumstances.

In brief the new rules would make the following changes:

(a) Tariffs providing rules and regulations governing the reconsignment and diversion of carload freight at designated hold points or which permit the acceptance of carload freight to be held at any points for the purpose of diversion or reconsignment, shall be cancelled.

(b) The so-called "regular" diversion and reconsignment tariffs are to be revised so as to provide that cars may be diverted or reconsigned when in transit and before arrival at the point to which originally billed, subject to a charge of \$3 per car for this service.

(c) It is understood that under the foregoing revision, the regulations which will appear in the diversion or reconsignment tariffs will be substantially as follows:

(1) For the purpose of applying the following rules the term "reconsignment or diversion" means a change in the name of the consignee; change in the name of the consignor; change in the route; change in the destination; any instructions necessary to effect delivery and not shown on

original billing; or any other change in shipping directions.

(2) If request is made for the reconsignment or diversion of freight in carloads prior to arrival at point to which first consigned or at terminal yard serving such point, the carrier will make diligent effort to locate the shipment in transit and effect reconsignment or diversion, but will not be responsible for failure to effect the reconsignment or diversion, unless such failure is due to negligence of its employees.

(3) If a car is diverted or reconsigned prior to arrival at original destination, or if the original destination is served by a terminal yard, then prior to arrival at such terminal yard, a charge of \$3 will be made for such service, except as otherwise provided. On shipments originating at stations on the lines (of this carrier), no charge for diversion will be assessed if orders for such diversion are received before car leaves the yard at which the road-haul begins.

(4) If order for diversion or reconsignment of car is placed with the local freight agent at billed destination, or other designated office, in time to permit instructions being given to yard employees prior to arrival at such billed destination, a charge of \$3 per car will be made for such service.

(5) When a car is stopped prior to arrival at original billed destination on request made by consignee or consignor, the point where the car is stopped will be considered the destination of the freight, and will be subject to the same reconsigning rules and charges as are applicable at the first billed destination.

(6) If a car is reconsigned within 24 hr. after arrival at original billed destination or terminal yard serving such destination, prior to placement on unloading tracks, a charge of \$5 per car will be made for such service.

(7) If a car is reconsigned subsequent to the first 24 hr. after arrival at original billed destination or terminal yard serving such destination, prior to placement on unloading tracks, a charge of \$7 per car will be made for such service.

(8) If a car is reconsigned within 24 hr. after placement on unloading tracks, a charge of \$6 per car will be made for such service.

(9) If a car is reconsigned subsequent to the first 24 hr. after placement on unloading tracks, a charge of \$8 per car will be made for such service.

(10) Cars that have been placed for unloading and reforwarded to a point within the switching limits of the billed destination will not be subject to reconsignment charge but will be subject to the published industrial or local tariff rate on file with the Interstate Commerce Commission and state commissions, in addition to the rate from the point of origin to billed destination.

(11) These rules and charges will apply whether shipments are handled on local rates, joint rates or combination of intermediate rates. The through rate to be applied under these rules is the rate lawfully on file with the Interstate Commerce or state Commissions from point of origin via the reconsigning point to final destination in effect on date of shipment from point of origin. If the rate from original point of shipment to final destination is not applicable through the point at which car is reconsigned, in connection with the line moving the traffic to that point, the sums of the locals will apply, plus reconsigning charges.

(12) No freight can be reconsigned or diverted under these rules to a station or point of delivery against which an embargo has been placed, either during the existence or subsequent to the removal of such embargo, unless such freight was forwarded from point of origin prior to the date effective of the embargo subsequent to its removal.

Roads Fail in Redistribution of Cars

In line with the general policy of bringing before the bar of public opinion the railroads which do not cooperate in car redistribution plans, the committee on car service of the American Railway Association has announced that eight roads had failed to carry out recommended redistribution measures. The announcement expressed a hope "that these lines will at once show a marked improvement in their performance." The roads named are: The Boston & Albany, the Maine Central, the Lehigh Valley, the Philadelphia & Reading, the New York Central, the Michigan Central, the Wabash, and the Toledo & Ohio Central.

"It is clearly apparent," said the announcement, "that these companies having an excess of box car equipment, have not complied with the request of the committee on car service to deliver a designated excess of box cars to Southern and Western connections above the number of box cars received from such connections."

Several other roads, it was said, appeared to have been derelict in complying with requests for box car redistribution, but the information regarding them was not complete.

The Interstate Commerce Commission has also taken the matter in hand and entered an order in its general car supply investigation demanding the railroads of the country to show cause on Dec. 28 why foreign cars were not returned to their owners.

Slushing in Illinois

Hydraulic filling of mine excavations is being considered by the Bureau of Mines under a cooperative agreement with the State of Illinois. Mine subsidence is presenting a problem of increased importance in Illinois due to the fact that much of the coal underlies rich agricultural lands. Subsidence results in the formation of ponds and marshes and often damages surface property to an extent which rivals the value of the coal which has been removed.

Occasional Wetting is Useless

That only the most thorough and constant wetting of a mine will prevent dust explosions has been demonstrated in recent experiments conducted by the Bureau of Mines at Bruceton, Penn. This is especially true in the winter when the dust dries out most rapidly. The tests, which are still in progress, are on mixtures of Pittsburgh coal, shale and water to determine what proportions of shale and water are necessary to make the coal dust inert. These trials were made under the standard conditions for explosion tests. The explosions are started by a 50-ft. ignition zone of (dry) pulverized Pittsburgh coal dust which is ignited by a blown-out shot of 4 lb. of black powder. The mixture to be tested is loaded along both entries for distances of 300 and 350 ft. from the ignition zone.

The coal was tested in three sizes: (1) Pulverized, of which nearly all would pass through a 100-mesh screen and 75 to 85 per cent. through a 200-mesh screen; (2) 20-mesh coal, of which 40 per cent. would pass through a 200-mesh screen; and (3) 20-mesh coal 20 per cent. of which would pass through 200-mesh. The percentage of water in the mixture was kept constant at either 10 or 20 per cent. and the proportion of shale increased until the mixture would not propagate flame. The coal, shale and water were mixed thoroughly before being placed in the mine.

Tests also were made with mixtures of coal dust and water, without shale dust. In one test pulverized coal mixed with more than 23 per cent of water was used. This mixture was wet enough to ball in the hand. At the time this test was made all the surfaces of the mine were very wet, the roof and the ribs dripping with moisture. A strong propagation of flame was obtained, the pressure developed being over 50 lb. per square inch at some points.

The 20-mesh coal of which 40 per cent. passed through 200-mesh would not propagate flame when mixed with 20 per cent. of water, but the coarser grade, 20-mesh of which 20 per cent. passed through 200-mesh, would propagate flame when mixed with 15 per cent. of water.

HARRISBURG, PENN.

The Pennsylvania Supreme Court on Jan. 3, will hear arguments on the contention that the right of surface support from mining operations is a tangible property right that may be sold or retained, or in other words that surface support is a third estate, distinct from mining rights and surface ownership. John G. Johnstown, of Philadelphia, one of the country's foremost lawyers, will make the principal argument in favor of surface protection.

The decision of the court will vitally affect more than half the improved section of Scranton, including much of the valuable central city lands. The case is far and away the most important cave case ever taken into any court.

What the court is practically asked to decide is that the Scranton Trust Co. owns the third estate or the right of surface support of all the original lands of the Lackawanna Coal and Iron Co., under a deed of May 4, 1915. That deed, upon which the whole case rests was the last act of the Lackawanna Coal and Iron Co., prior to its dissolution and was really part of the dissolution process.

The Pennsylvania Supreme Court in its decision in the Graft Furnace case intimated that the right of surface support is really a third estate, a property right that may be sold, resold or retained.

If the Supreme Court finds that the trust company owns the right of the surface support over all the coal the Lackawanna Coal and Iron Co. owned, then the trust company will be in position to solve the whole cave problem in a large area of Scranton. It may deed that right to the individual property owner.

As this question is of keen, vital interest to the whole anthracite region, the question arises can the surface property owners buy this right to surface protection and thereby insure themselves against mine caves. The Trust company owns neither coal nor the surface.

PENNSYLVANIA

Anthracite

Pottsville—The Myrtle Coal Co. has secured leases from the Morris and Richards estates whereby it is permitted to mine coal in 15 coal measures underlying this city. The company is now seeking bids for the erection of a breaker with a capacity of 300 tons daily. In addition the new concern has secured an option on over 1,000,000 tons of culm nearby and is preparing to utilize this material in the manufacture of boulettes. It claims to have a process whereby with an admixture of Kentucky cannel coal and a heavy fuel oil a product is produced that is little inferior to fresh-mined coal for domestic purposes. It is stated that the briquette plant will be erected near New York City and the culm shipped to that point.

The Pine Hill Co. announced that it will pay its workmen a bonus of 5 per cent. over their regular wages on all egg, stove and chestnut coal mined over and above a fixed standard, the increase to date from Nov. 1. Any workmen absent more than two days in one month without leave will not share in the distribution.

What is likely to be the heaviest award made by the State Compensation Board will result from the accidental death of John Zusky, who was killed in a mine near here. Besides a widow, nine small children survive, and as a separate award must be made for each one the total amount will likely constitute a record.

Scranton—David and S. S. Spruks recently purchased the assets of the Minooka Coal Co. at public auction for \$37,155. The property includes the mine, a breaker, mine cars, tools, mining machinery and other incidentals necessary to coal production located at Minooka. Spruks Brothers have recently acquired several valuable coal properties in this vicinity.

Bituminous

Somerset—The tippie of the Neva mine, several miles north of Somerset was recently destroyed by fire. About 100 men will be out of employment until a new tippie can be constructed.

Brownsville—The Diamond Coal and Coke Co. has a gang of men working at the Peoples coal mine, cleaning the place up. Orders for heavy locomotives have been placed, and it is expected that these will be shipped in February. The company will ship the majority of the coal by river, and it is believed that shipment will be begun in April.

Connellsville—The estimated coke production for the Connellsville region during the week ended Dec. 16 is placed at 375,901 tons, of which the merchant ovens produced 138,798 tons, and the furnace ovens 236,703 tons. This production is a decrease of 25,164 tons by the former and by the latter of 24,100, or a total decrease of 49,264 tons. Shipments aggregated 10,178 cars carrying 362,293 tons.

WEST VIRGINIA

Omar—The Island Creek Coal Co., through Thomas H. Brooks, recently arranged to present a Christmas gift to every child in the town under 16 years of age, the number being estimated at about 1,200. A great Christmas tree was also furnished and decorated by the company for the holidays.

Gary—Clark & Walker, general contractors, were recently awarded a contract by the United States Coal and Coke Co. for 93 six- and eight-room double houses, equal to 186 single houses. This contract also includes grading, foundations, water and electric lines, fences, sidewalks, gutters, etc. These improvements will be made at works Nos. 6, 7, 8 and 9. Although this contract is a large one, it is only a part of the vast improvements contemplated by this company during the year 1917.

Hughes—Fire originating from a spark from a passing locomotive recently destroyed the coal tippie of the West Virginia Gas Coal Co. It will be probably 60 days before the tippie can be rebuilt. Traffic on the railroad was delayed somewhat by the destroyed tippie.

Charleston—Congestion of loaded coal cars and manifest freight between Charleston and Cincinnati has been decidedly relieved during the recent past, and conditions as to car supply are now somewhat better. Embargoes are being declared by the railroads against certain individuals and firms because of the misuse of coal cars and inadequate facilities for handling the coal shipped to them. The shippers on originating lines are urging that railroads west of Cincinnati be asked to facilitate the movement through cooperation between coal-traffic departments.

Fairmont—Cold weather during the recent past and a muddled car-supply situation on the Monongah Division of the Baltimore & Ohio R.R. has resulted in a poor car supply. It is believed that no immediate relief is in sight and if things continue to grow worse, it is more than possible that some of the mines of the region may be forced to close down.

ALABAMA

Birmingham—The state has awarded the contract for county convicts for next year to the Pratt Consolidated Coal Co. of Birmingham. The price is \$12 per month for able bodied convicts sentenced to 90 days or more.

Coal operators of the Birmingham district believe next year will see the greatest tonnage of coal ever mined in Alabama. The market is firm, and with the opening of new mines it is believed that the tonnage will go to 18,000,000. The largest tonnage recorded was 17,907,284 in 1913.

The Tennessee Coal Iron & Railroad Co. will no longer ship coal out of the Birmingham district, but will use it for fuel purposes in its industries.

The completion of a new haulage-way at the Searles coal mines of the Alabama Co. about the first of the year will reduce the distance from the workings to the tippie from two miles to a few hundred yards, and result in a large increase in the output, and a reduction in cost.

Edgewater—One man was killed and two injured Dec. 20 in an explosion at the Edgewater mine of the Tennessee Coal, Iron and Coke Co. Seventy-three men escaped uninjured. It is reported that following this explosion a panic occurred among the miners, and it was at first stated that many men had been entombed.

KENTUCKY

Yeager—The Detroit-Kentucky Coal Co. is getting well under way on its Robinson Creek development and will make its first shipments to the markets of the Northwest early in January according to an announcement. Fifty new miners' houses are under way at this plant.

Hazard—Large increases will be made by operators in the Hazard field during the coming year and the output largely increased. Within 300 days it is planned to have a daily output of 300 cars. The Kentucky River Power Co. will soon have its plant completed. Coal operators say the completion of the plant will greatly facilitate the mining work. Transmission lines are connecting all the twenty odd plants with the central station. This is one of the largest individual power stations in Kentucky.

The Blue Diamond Coal Co. operating at Bufalo will double its output within two weeks, according to an announcement. The plant is reached by a branch of the Louisville & Nashville.

The Fourseams Colliery Co., one of the new companies operating in the Buffalo Creek section has made its first shipments of coal which were destined to the markets of the Northwest. It is now loading four cars daily. This output will be increased immediately after the first of January.

Kona Station—(Mater P. O.) The Detroit-Elk Coal Co. will start a new coal development immediately below Kona Station on the W. H. Potter coal land tract. S. L. Bastin of Lexington will have supervision over the work as manager. The company plans a daily capacity of 1,000 tons to start with.

Whitesburg—It is said here that the coal output of this (Letcher) county will exceed the tonnage of any other county in Kentucky for the year 1916, Pike and Harlan being close seconds. Developments are only fairly started, and three-fourths of the county is almost untouched. It is safe to say that the output for 1917 will be about doubled over the present year. A large number of new operations are coming into this territory to start work immediately after the first of the year.

Beattyville—The Beattyville Co. is rapidly completing the development work on its coal mine near here in Lee County, and will begin shipping down the river soon. Other developments of coal lands in Lee County are reported in prospect.

Madisonville—The fan house of the Highland mines of the Ruckman Coal Co., at Providence, Ky., was destroyed by an incendiary fire on the night of Dec. 15. The watchman discovered the blaze while making his rounds and stated that he started for the fire but was detained by three armed men until the building was destroyed. The company is offering a reward.

Nebo—The Rose Creek Coal Co., at Coiltown, is taking out coal for the local demand and for its power house and has opened its commissary. Shipping will begin shortly.

Louisa—The Nats Creek Coal Co. is completing its railroad, driving entries, etc., and will begin shipping about the first of the year. F. L. Stewart is in charge of the operation.

OHIO

Columbus—Upon the authority of the Public Utilities Commission, this is the last year that natural gas can be used for manufacturing purposes to any extent in Ohio. This action is taken in order to conserve the natural gas supply for domestic purposes only. The shutting off of the gas supply has thrown thousands of men and women out of employment and has caused great hardships throughout the state. An injunction secured by certain manufacturing establishments of Lancaster against the local gas company from turning off the supply has been dissolved and as a result the factories had to shut down. The ruling of the utilities commission will increase the consumption of coal for steam purposes to a great extent. Some of the factories in Columbus announce that they will move out of the city.

INDIANA

Terre Haute—Coal operators composing the membership of the Northern Indiana Coal Trade Bureau, with headquarters here, have decided to raise a fund of \$10,000 to maintain action seeking to compel the railroads to supply more coal cars. The secretary of the Bureau, Charles G. Hall, was instructed to levy an assessment on the members to raise the money.

ILLINOIS

Auburn—The Auburn & Alton coal mine, a few days ago, broke its hoisting record by loading a total of 1,074 tons. The mine is under the management of J. W. Minzie.

Millstadt—Miners employed at the Marxer & Pistor mine at this place have returned to work after being on strike for a week on account of a wage dispute. The men say they have not received the increase of 3c. a ton provided for by the Baltimore agreement. Walter Nesbit, of Belleville, persuaded them to return to work pending an adjustment.

Kincaid—An effort on the part of Charles Ramon, an American miner, to save a 30c. can of carbide cost him his life in the Peabody mine No. 7 here a few days ago. He had lighted a fuse when he remembered that he had left the can of carbide near the face of the coal. He ran to get it and the charge exploded just as he reached it. He died in a short time from his injuries.

Virden—The North mine at Virden, which has been closed since January, 1915, when it was partially destroyed by fire, has resumed operation. One hundred and fifty men are employed and it is expected that shortly after the beginning of the year the force will be doubled.

KANSAS

Topeka—Owing to the fact that the coal mining laws of the State of Kansas have proved inadequate and impractical of successful operation under modern working conditions, it is recommended by State Mine Inspector Pellegrino that the next session of the legislature shall revise and codify the existing statutes. This recommendation is comprised in a report filed with Paul J. McBride, state labor commissioner. The report declares that the best way to get mining laws which will be of benefit to the operators and miners alike will be to repeal all the former laws and adopt a new code. It also asserts that some of the state mining laws are being violated every day because they are impractical, while others are conflicting in their provisions. Some also are found to provide no penalties and many will not stand the test if taken into court.

Personals

C. H. Nesbit, chief state mine inspector of Alabama, estimates that the coal production in Alabama will go above 16,000,000 tons in 1916. The actual figures on production will not begin coming in until about Jan. 10 or 15.

John H. Winders of Columbus, Ohio, was recently appointed receiver for the Sunday Creek Coal Co. upon the petition of the Webster Manufacturing Co. of Tiffin, Ohio, which has obtained judgment against the Sunday Creek Co.

Dr. Harry W. Keatley who recently resigned as senior assistant physician at the State Hospital at Huntington, W. Va., has accepted a position with the Cabell Coal Co. the properties of which are in the Kenawha field. Dr. Keatley was formerly employed by this firm.

R. S. Bain, formerly sales agent for the Lake Erie Coal Co., at Cleveland, has been appointed manager of the Central Coal Mining Co., with offices at 309 Rockefeller Building, Cleveland. This firm has purchased the Clifford mine, located in Belmont County, Ohio. It has an output of 1,250 tons per day and is capitalized at \$150,000.

Obituary

Jenkin Jones, vice-president of the Pocahontas Consolidated Collieries Co., and last of the pioneer Pocahontas operators, died at his home in Bluefield, W. Va., on Dec. 19, at the age of 77 years.

E. R. Vowels, aged 39, one of the leading young coal operators of the Middlesboro (Ky) field died at his home in Middlesboro a few days ago after a long illness. Brights disease is given as the cause of his death. Mr. Vowels was perhaps known by more coal men than any other man in Kentucky. He was a successful operator, owning several good sized plants in the Yellow Creek valley.

Recent Coal & Coke Patents

Stoker, W. Shore, Minneapolis, Minn. 1,203,063. Oct. 31, 1916. Filed Mar. 24, 1916. Serial No. 86,494.

Stoker, W. S. Haslen, Montevideo, Minn. 1,206,701. Nov. 28, 1916. Filed Feb. 9, 1915. Serial No. 7,184.

Stoker. F. B. Bigelow, Detroit, Mich. 1,198,316, Sept. 12, 1916. Filed July 19, 1915. Serial No. 40,536.

Mine Car. M. D. Bland, Philadelphia, Penn. 1,202,357, Oct. 23, 1916. Filed Nov. 27, 1915. Serial No. 63,798.

Furnace Grate. G. F. Spencer, Thompson, Penn. 1,206,046, Nov. 28, 1916. Filed Dec. 27, 1915. Serial No. 68,785.

Coke Oven Take Off. A. Roberts, Evanston, Ill. 1,198,582, Sept. 19, 1916. Filed Apr. 17, 1915. Serial No. 22,145.

Boiler Furnace. W. Lamb, Brooklyn, N. Y. 1,205,228, Nov. 21, 1916. Filed Apr. 24, 1916. Serial No. 93,220.

Mine Car Wheel. E. E. Slick, Westmont, Penn. 1,203,800, Nov. 7, 1916. Filed June 9, 1915. Serial No. 32,996.

Automatic Stoker. G. W. Wood, Camden, N. J. 1,206,071, Nov. 28, 1916. Filed Feb. 15, 1916. Serial No. 78,342.

Mine Car Body. E. E. Slick, Westmont, Penn. 1,206,151, Nov. 28, 1916. Filed Nov. 18, 1915. Serial No. 64,082.

Chain Grate. A. Girtanner, St. Louis, Mo. 1,202,180, Oct. 24, 1916. Filed Mar. 23, 1914. Serial No. 826,529.

Mining Machine. S. P. C. Borson, Salida, Colo. 1,203,573, Nov. 7, 1916. Filed Nov. 27, 1914. Serial No. 874,295.

Mechanical Stoker. C. J. Pilliod, Toledo, Ohio. 1,198,148, Sept. 12, 1916. Filed Sept. 8, 1914. Serial No. 860,694.

Cross Drum Boiler. E. C. Meier, Phoenixville, Penn. 1,196,878, Sept. 5, 1916. Filed Aug. 6, 1915. Serial No. 43,953.

Mechanical Stoker. E. A. Wall, Salt Lake City, Utah. 1,204,522, Nov. 14, 1916. Filed June 9, 1916. Serial No. 102,739.

Coal Handling Plant. C. S. Williamson, Chicago, Ill. 1,205,303, Nov. 21, 1916. Filed July 20, 1912. Serial No. 710,559.

Coal Loading Apparatus. H. B. Doherty, Everett, Mass. 1,203,348, Nov. 7, 1916. Filed Sept. 19, 1914. Serial No. 862,502.

Coke-Oven Door. J. A. McCreary, Connellsville, Penn. 1,200,123, Oct. 3, 1916. Filed Nov. 15, 1915. Serial No. 61,716.

Byproduct Coke Oven. G. H. Benjamin, New York. 1,205,698, Nov. 21, 1916. Filed Dec. 11, 1911. Serial No. 664,987.

Nut for Mining Machines. C. S. Sheppard, Pittston, Penn. 1,203,145, Oct. 31, 1916. Filed Feb. 17, 1916. Serial No. 78,922.

Method of Mining Coal. H. A. Kuhn, Pittsburgh, Penn. 1,200,205, Oct. 3, 1916. Filed Dec. 9, 1915. Serial No. 65,942.

Boiler Grate. T. N. Smith and D. K. Briggs, Portsmouth, Va. 1,202,002, Oct. 10, 1916. Filed June 21, 1915. Serial No. 35,470.

Smoke Consumer. A. H. C. Beatty, Independence, Mo. 1,199,656, Sept. 26, 1916. Filed May 15, 1914. Serial No. 838,759.

Coal Transferring Apparatus. K. E. Rochel, Galveston, Tex. 1,204,594, Nov. 14, 1916. Filed July 19, 1915. Serial No. 40,637.

Gearing for Mining Machines. E. C. Morgan, Chicago, Ill. 1,200,515, Oct. 10, 1916. Filed Feb. 10, 1913. Serial No. 747,251.

Method of Carbonizing Coal. H. L. Doherty, New York, N. Y. 1,197,804, Sept. 12, 1916. Filed Mar. 21, 1913. Serial No. 755,955.

Fuel Saving Attachment for Furnaces. N. J. Russell, Chicago, Ill. 1,205,789, Nov. 21, 1916. Filed May 1, 1916. Serial No. 94,611.

Pulverized Coal Feeding Apparatus. La Rue B. Chevalier, Iola, Kan. 1,203,703, Nov. 7, 1916. Filed Mar. 6, 1916. Serial No. 82,398.

Feed Mechanism for Mining Machines. L. F. Hess, Ansted, W. Va. 1,200,941, Oct. 10, 1916. Filed May 5, 1915. Serial No. 26,000.

Coal-Washing Apparatus. E. G. Burks and N. Hayes, Birmingham, Ala. 1,201,143, Oct. 10, 1916. Filed Aug. 16, 1915. Serial No. 45,705.

Recuperative Foundations for Coke Ovens. A. Roberts, Evanston, Ill. 1,197,306, Sept. 5, 1916. Filed Dec. 4, 1914. Serial No. 875,503.

Excavating and Tunneling Machine. H. A. Storrs, Chicago, Ill. 1,199,127, Sept. 26, 1916. Filed Dec. 26, 1913. Serial No. 808,730.

Adjustable Coal-Boring Auger. C. N. Barton, Indianapolis, Ind. 1,198,690, Sept. 19, 1916. Filed Sept. 14, 1914. Serial No. 861,543.

Apparatus for Separating Coal, Ore, Etc. H. P. Pardee, Hazleton, Penn. 1,197,946, Sept. 12, 1916. Filed May 2, 1913. Serial No. 765,171.

Furnace Grate. G. A. Kohut, assignor to Shear Klean Grate Co., Chicago, Ill. 1,196,246, Aug. 29, 1916. Filed Jan. 30, 1913. Serial No. 745,211.

Coal Economy Means. R. E. Jackson, Victoria, and F. E. Bell, Norfolk, Va. 1,199,896, Oct. 3, 1916. Filed July 31, 1915. Serial No. 43,008.

Mining Machine. C. H. Boardman, assignor to Sundries Mfg. Co., Portland, Me. 1,199,757, Oct. 3, 1916. Filed Feb. 5, 1915. Serial No. 61,336.

Mining Machine. A. Ball, assignor to Sullivan Machinery Co., Boston, Mass. 1,205,076, Nov. 14, 1916. Filed Nov. 24, 1908. Serial No. 464,320.

Method of and Apparatus for Handling Coal. DeWitt W. Buchanan, Chicago, Ill. 1,201,685, Oct. 17, 1916. Filed Feb. 12, 1915. Serial No. 7,766.

Apparatus for Washing Coal. P. Habets, Montegnée, Bel., and A. France, Liege, Bel. 1,197,932, Sept. 12, 1916. Filed Feb. 9, 1914. Serial No. 817,665.

Mine Car. W. V. Johnson, assignor to American Car and Foundry Co., St. Louis, Mo. 1,199,794, Oct. 3, 1916. Filed Aug. 4, 1916. Serial No. 113,127.

Underfeed Stoker. W. J. Kenney, assignor to Underfeed Stoker Co., Chicago, Ill. 1,196,869, Sept. 5, 1916. Filed Apr. 11, 1912. Serial No. 690,154.

Traveling Grate. M. W. Sewall, assignor to Babcock & Wilcox Co., Bayonne, N. J. 1,200,247, Oct. 3, 1916. Filed Feb. 3, 1913. Serial No. 745,807.

Miner's Acetylene Lamp. A. L. Hansen, assignor to Justrite Mfg. Co., Chicago, Ill. 1,202,514, Oct. 24, 1916. Filed July 26, 1915. Serial No. 41,889.

Mining Machine and Truck. J. London, assignor to Sullivan Machinery Co., Boston, Mass. 1,205,097, Nov. 14, 1916. Filed Oct. 7, 1914. Serial No. 864,379.

Automatic Coupling for Mining Cars. J. A. Forsyth and H. G. Adamson, Frederickstown, Penn. 1,201,283, Oct. 17, 1916. Filed Apr. 1, 1915. Serial No. 18,473.

Process of Burning Powdered Coal and Analogous Fuel. E. P. Roberts, Cleveland, Ohio. 1,200,028, Oct. 3, 1916. Filed Dec. 10, 1915. Serial No. 66,028.

Mechanical Stoker. W. T. Hanna, assignor to Mechanical Construction Co., Cincinnati, Ohio. 1,200,436, Oct. 3, 1916. Filed Oct. 28, 1911. Serial No. 657,251.

Mechanical Stoker. W. T. Hanna, assignor to Mechanical Construction Co., Cincinnati, Ohio. 1,203,871, Nov. 7, 1916. Filed Jan. 2, 1912. Serial No. 669,057.

Chain Grate. C. G. M. Bennett and S. H. Smith, assignors to Babcock & Wilcox Co., Bayonne, N. J. 1,206,197, Nov. 28, 1916. Filed Mar. 25, 1913. Serial No. 756,674.

Apparatus for Increasing the Efficiency of Boiler Furnaces. J. H. Rice, Boston, Mass. 1,199,305, Sept. 26, 1916. Filed Sept. 8, 1914. Serial No. 860,774.

Apparatus for Treating Coal and Other Hydrocarbonaceous Substances. J. D. Scott, Detroit, Mich. 1,198,069, Sept. 12, 1916. Filed Aug. 26, 1910. Serial No. 579,019.

Smoke-Consuming Boiler. W. C. Gurney, assignor to Gurney Heater Manufacturing Co., Boston, Mass. 1,198,838, Sept. 19, 1916. Filed Apr. 9, 1915. Serial No. 20,280.

Car-Unloading Apparatus. W. K. Monroe, assignor to Brown Hoisting Machinery Co., Cleveland, Ohio. 1,196,134, Aug. 29, 1916. Filed Sept. 23, 1915. Serial No. 52,188.

Automatic Feeding Device for Furnaces. P. Q. Williams, assignor to Charles Boldt Co., Cincinnati, Ohio. 1,201,664, Oct. 17, 1916. Filed Oct. 23, 1913. Serial No. 796,809.

Dump Car Door Operating Mechanism. A. Campbell, assignor to Enterprise Railway Equipment Co., Chicago, Ill. 1,204,543, Nov. 14, 1916. Filed Mar. 11, 1916. Serial No. 83,471.

Apparatus for Quenching, Screening and Loading Coke. C. Piez, assignor to Link Belt Co., Chicago, Ill. 1,206,588, Nov. 28, 1916. Filed May 8, 1912. Serial No. 696,005.

Excavating Attachment for Mining Machines. J. H. Morgan, assignor to American Morgan Co., Morgan Park, Ill. 1,196,135, Aug. 29, 1916. Filed Aug. 6, 1910. Serial No. 575,962.

Shaking and Control Mechanism for Furnaces. W. J. Manhire, assignor to Combustion Specialty Co., Kansas City, Mo. 1,200,511, Oct. 10, 1916. Filed Aug. 16, 1915. Serial No. 45,824.

Coal-Sorting Method and Apparatus. H. Adams, assignor to Adams Mining Machine Corporation, New London, Conn. 1,198,808, Sept. 19, 1916. Filed May 11, 1916. Serial No. 96,775.

Catalogs Received

Power Hammers. Beaudry & Co., Inc. 141 Milk St., Boston, Mass. Booklet. Pp. 16; 3½x6 in.; illustrated.

Wico Safety Electric Mine Lamp. Witherbee Igniter Co., Springfield, Mass. Catalog. Pp. 10; 6x9 in.; illustrated.

"Spraco" Paint Gun. Spray Engineering Co., 93 Federal St., Boston, Mass. Booklet. Pp. 13; 3½x6 in.; illustrated.

Plymouth Gasoline Locomotives. The J. D. Fate Co., Plymouth, Ohio. Catalog No. 3. Pp. 96; 6x9 in.; illustrated.

Giant Fuel Oil Engines. Chicago Pneumatic Tool Co., Fisher Building, Chicago, Ill. Bulletin 34-W. Pp. 28; 6x9 in.; illustrated.

Midvale High-Speed Tool Steels. The Midvale Steel Co., Widener Building, Philadelphia, Penn. Pamphlet. Pp. 22; 4x7½ in.; illustrated.

Duntley Portable Electric Hoists. Chicago Pneumatic Tool Co., Fisher Building, Chicago, Ill. Bulletin E-45. Pp. 4; 6x9 in.; illustrated.

Boyer Railway Speed Recorder. Chicago Pneumatic Tool Co., Fisher Building, Chicago, Ill. Bulletin No. 263. Pp. 28; 6x9 in.; illustrated.

Hose, Hose Couplings, Hose Clamp Tools. Chicago Pneumatic Tool Co., Fisher Building, Chicago, Ill. Bulletin No. 129. Pp. 8; 6x9 in.; illustrated.

Automatic Reclosing Circuit Breakers. The Automatic Reclosing Circuit Breaker Co., 38 N. Water St., Columbus, Ohio. Bulletins. 6x9 in.; illustrated.

Single and Multistage Steam Turbines and Reduction Gears. Moore Steam Turbine Corp., Wellsville, N. Y. Bulletin No. 1. Pp. 12; 6x9 in.; illustrated.

Alloy and Tool Steels. The Midvale Steel Co., Widener Building, Philadelphia, Penn. Revised Catalog No. 33. Pp. 144; 4½x7 in. This contains tables and other data, also charts showing critical temperatures and physical properties of these steels.

Handling Coal and Ashes in the Power House of Wm. H. Grundy Co. and Handling Coal in the Victor Power Plant are the titles of two bulletins issued by the Link-Belt Co., Chicago, Ill., showing the use of Link-Belt equipment in these plants.

Industrial News

Duluth, Minn.—During the navigation season of 1916 recently closed, 9,430,700 tons of coal arrived at Duluth as compared with 8,376,211 tons in the same period of 1915.

Chattanooga, Tenn.—The Cincinnati, New Orleans & Texas Pacific, has cancelled its coal confiscation order and mine operations are now being called on for only the normal supply of coal.

Steubenville, Ohio.—It was recently announced that the Russell Coal and Mining Co. property at Tiltonville had been taken over by the W. H. Warner Coal Co. of Cleveland. The consideration involved was not made public.

Detroit, Mich.—The wooden barge "Santiago" with a cargo of coal recently sank in Lake St. Clair as the result of being cut open by heavy ice. The captain and crew of the barge were rescued by the tug which had the vessel in tow.

St. Louis, Mo.—Figuring that screenings are more efficient in a new type of monster locomotive, the Missouri Pacific system has equipped 14 new engines with 43 per cent. more tractive power than the Mikado type, with stokers for burning screenings.

Charleston, W. Va.—The State Department of Mines recently announced that the official tonnage of coal and coke over the Norfolk & Western R.R. during November amounted to 2,730,000 tons. All the coke handled by this road came from the Pocahontas field.

Martins Ferry, Ohio.—Harry Baldini, miner of Bellaire, recently convicted of holding up and murdering Lee Rankin, paymaster of the Florence mine of the Youghiogheny & Ohio Coal Co. at Martins Ferry was recently sentenced to life imprisonment in the Ohio State Penitentiary.

Clarksburg, W. Va.—The Grasselli Chemical Co. is opening a mine on its property near Clarksburg to furnish coal for 22 gas producers now under construction. This firm has 250 acres of Fairmont gas coal, which it is developing. The mine will ultimately produce about 1,000 tons per day.

Hazard, Ky.—The Douglas Coal Mining Co. in "the Bend" immediately below here will begin shipping coal within the next few days. Much of the heavy machinery to be used by the company is being unloaded. A one-mile branch of the Louisville & Nashville has been constructed to the new operation.

Pittsburgh, Penn.—The Duquesne Light Co. has purchased a coal mine at Berwick, Penn., for the economical supply of its new 60,000-kw. generating station at that point, as well as for the old station at Brunot Island. Coal will be dumped from the mine cars directly into the bunkers of the power plant.

St. Louis, Mo.—Prof. E. L. Ohle of Washington University from figures recently taken shows that 20,000 tons of soot fell upon St. Louis in the last six months. The average fall of soot upon the city was 53.7 tons per square mile. The November fall was 87.35 tons per square mile, while Pittsburgh's fall per square mile was 82 tons.

Ancon, Canal Zone.—A record for quick coal-ing was recently made at the new coaling plant of the Panama Canal at the Atlantic terminus.

This plant delivered 420 tons of coal into the bunkers of a ship and sent her on her way in 24 minutes. This was done with the use of only one of the four loading towers with which the plant is equipped.

Louisville, Ky.—Coal operators of eastern Kentucky, Tennessee and Virginia have been notified that the Interstate Commerce Commission has suspended increase of from 5 to 30 cents a ton on coal from mines on the Louisville & Nashville R.R. to points in Illinois, Wisconsin and Iowa. These have been suspended, pending investigation, until Apr. 9 next.

Buffalo, N. Y.—The mine now opening at Marion Center, Indiana County, Penn., by Harry Yates, of this city, and Dr. W. S. Blaisdell, of Punxsutawney, is ready to ship coal as soon as the Buffalo, Rochester & Pittsburgh R.R. can furnish cars. The track connections will be in soon. About 500 tons a day will be produced. The mine is to be called the Marion.

Birmingham, Ala.—It is announced that the Woodward Iron Co. will repair and place in operation 200 bee-hive ovens at its Dolomite mine. These ovens have been idle for a number of years. The Woodward Co. has a total of 794 bee-hive ovens, all of which are in blast except those at Dolomite, and 170 by-product ovens, and is now building 60 more of the latter type.

Birmingham, Ala.—The Yolande Coal and Coke Co. announces that it will begin preparations at once for the opening of a new mine on the Jagger seam, in Tuscaloosa County, near its openings Nos. 1 and 2. A large sum will be expended in connection with the new development, but it will probably be six or eight months before coal will be produced from this mine.

Chattanooga, Tenn.—Twenty-four additional by-product coke ovens are to be added to the plant of the Chattanooga Gas and Coal Products Co., according to Lewis F. Wolfe, president. It is stated that the improvement will cost about \$500,000 although the details as to the type of ovens, etc., have not been worked out. It is hoped to have the additional ovens in operation by next fall.

Moundsville, W. Va.—A deal was recently consummated whereby the Central Coal Mining Co. of Cleveland, Ohio, became the owner of the Clifford coal mine formerly known as the Fort Pitt mine, directly across the river from this city. The new owners have already taken charge. No change in the management will be made, but improvements will be made which will greatly increase the output.

Wellsburg, W. Va.—Cyrus Ferguson is reported to be buying up coal lands in the Buffalo district of Brooke County. He recently purchased 1,300 acres from Harlan McCord and James McAdoo. It is reported that Mr. Ferguson will soon open a coal mine on Buffalo Creek. A short time ago he took over the old Rex Carbon mine in the Cross Creek district, which is now being operated to capacity.

Paducah, Ky.—The West Kentucky Coal Co. has let a contract for the materials to be used in the construction of 50 coal barges which will be used on the lower Mississippi, Cumberland and Tennessee rivers. Oregon fir, pine and oak will be used in construction of the barges and the work will be done by the company's own employees in the yards at Mechanicsburg, Ky. Lumber will begin arriving in February.

Indianapolis, Ind.—The fifth furnace at the Belmont plant of the Link-Belt Co. at Indianapolis, was blown in the middle of December, adding materially to the capacity for producing malleable link-belt. Extensive building operations at the Belmont works have been completed, and the manufacturing activities reorganized to keep pace with the increasing demand for this firm's product for conveying, elevating and power transmission purposes.

Toronto, Ont.—For the six months ending Oct. 31 the Canadian Northern R.R. carried 200,000 tons of coal from the Cardiff and Drumheller districts located along the company's line in Alberta. This is an increase of 100% over the similar period of 1915, when 100,000 tons were mined. The fuel is of a semi-bituminous character and is marketed in Canada to points as far east as Winnipeg, being in competition at that point with Pennsylvania coal.

London, England.—It is reported that owing to the shortage of ships for the transportation of coal an extraordinary congestion exists in South Wales. Miles of storage tracks at Cardiff and Newport are choked with coal-laden trucks which have been accumulating for some time, with the result that there is now a shortage of cars. Some of the mines are idle and there has been a loss in production of approximately one million tons in three weeks.

Jackson, Ky.—A. B. Kerr, of New York, was the buyer of 40,000 acres of coal and timber lands in Breathitt and Knott counties when the property was sold at the courthouse door recently by John Menzies, United States Clerk. Mr. Kerr bid the property in at \$500,000. The sale was by order of the Federal court in settlement of a suit brought by the United States Mortgage & Trust Co., of New York as trustee, against the Kentucky Coal and Timber Development Co.

Pittsburgh, Penn.—Following the sale of 12,000 acres of coal lands in Greene County, held by Josiah V. Thompson, former Uniontown banker, to the H. C. Frick Coke Co., for about \$7,000,000, came the announcement, on Dec. 20, that the Bethlehem Steel Co. is negotiating for 20,000 acres of coal land held by Mr. Thompson in the same county. The 20,000 acres which the Bethlehem Steel Co. is understood to be seeking will bring, it is estimated, between \$12,000,000 and \$16,000,000.

Birmingham, Ala.—On Jan. 1, 1917, the Alabama Co. will cease operations at its old Searles mine, in Tuscaloosa County, and turn the same over to the Central Coal and Iron Co., having sold these old workings to the latter firm. The Alabama Co. will secure its entire output from its new opening at the same point. The new mine has been in course of development for several months and the output has now reached such proportions as will enable the company to abandon the old slope.

Ashland, Ky.—The Chesapeake & Ohio R.R. has received plans for the construction of a new hump on land recently purchased at Russell, Ky. This will handle the coal which the C. & O. has delivered to the Norfolk & Western at Kenova, will be constructed as soon as the C. & O. Northern is completed and, to a large extent, will relieve the congestion in the Covington and Cincinnati yards. The C. & O. is delivering six million tons of coal annually to the N. & W., the equivalent of ten 85-car trains a day.

Louisville, Ky.—Ice and low water in the Ohio River are impeding river coal traffic again. Various reports are being received as to coal tows stranded on the sandbars, while there are many reports as to craft sunk by ice and the tying up of more to escape ice damage. The Dugan Coal Co., which for 50 years has maintained its station at the foot of Second street, Louisville, has for the first time in its history, moved its fleet out of the way of the ice into the Louisville & Portland canal. Other coal concerns are seeking similar harbors.

East St. Louis, Ill.—E. M. Sorrells, secretary of the East St. Louis Commercial Club, has received notification from the Illinois Public Utilities Commission that the commission has concluded an inquiry into alleged overcharges by the railroads of demurrage to coal dealers and manufacturers in East St. Louis, Venice, Granite City and Madison. A decision will be handed down in a few days. It is alleged that the roads, in violation of a tariff ruling, have been charging for the past five years demurrage after 48 hours, when they should not have charged until after 72 hours.

Washington, D. C.—Tariffs of the P. C. C. & St. L. and other railroads proposing increases of 15 to 30c. a ton in coal rates on bituminous coal from points in Pennsylvania and West Virginia destined to stations on the Erie, Lehigh Valley, Delaware, Lackawanna & Western, New York Central and other eastern lines, were suspended recently by the Interstate Commerce Commission until Apr. 14 pending an investigation. Proposed increases of 1 to 30c. per ton on coal over southwestern roads from Dawson, N. M., to points in Texas were suspended until the same date.

Washington, D. C.—The decision of the Supreme Court of Pennsylvania in awarding damages to the Stineman Coal Co., against the Pennsylvania R.R. for alleged discrimination in the distribution of coal cars was set aside, on Dec. 18, by the Supreme Court of the United States. The coal company held that it suffered discrimination because in the allotment of coal cars for its use the carrier had included some of the coal company's privately owned cars. Under a ruling of the Interstate Commerce Commission railroads are permitted to include privately owned cars in the allotment made to their owners by the railroads.

St. Louis, Mo.—Announcement was made recently of the plan by which the Chicago & Northwestern and the Atchison, Topeka & Santa Fe railway systems are to enter St. Louis, using their own terminals. This will provide in one instance an inlet on the east for the C. & N. W. from its vast coal properties about 50 or 60 miles from St. Louis. These mines are the largest in Illinois. It will enable the Northwestern to deliver its coal tonnage for the northwest through the St. Louis gateway, and will open up hundreds of miles of railroad territory on both the Northwestern and the Santa Fe systems to the mines of southern Illinois.

New York, N. Y.—The Blackburn-Smith Corporation, 105 W. 40th St., New York, through the purchase of the filter department of James Beggs & Co., has acquired all patents, records, patterns and rights for the manufacture and sale of the Blackburn-Smith feed water filter and grease extractor and the Blackburn-Smith sewage ejector system. The engineers and agents previously identified with these products have been taken over in a body by the new corporation and will in future work under the direction of Irwin H. Kaufman, vice president, who has supervised the manufacture, sale and installation of the Blackburn-Smith filter for the past ten years.

Cincinnati, Ohio.—Receivers Judson Harmon and Rufus B. Smith, of the Cincinnati, Hamilton & Dayton Railroad Co., have filed in the United States District Court a petition asking leave to

sell the securities of the Tuxhorn Coal Co., of Keys, Ill., owned by the road and now pledged to the Baltimore & Ohio. The securities consist of \$40,000 of stock and \$25,000 of bonds, for which the receivers say they have an offer of \$20,000, and it is this offer which they desire to accept. J. W. Jefferson, of Springfield, Ill., is said to have made the offer. The petition says that the mining company has been operated since Jan. 1, 1912, at a loss of \$25,873.73, and that the value of its securities is depreciating.

Chattanooga, Tenn.—The Manufacturers Association of Chattanooga, which in various matters is now proceeding on a cooperative basis, contemplates entering the coal business. According to a plan which has been laid before the members, the association would incorporate a separate corporation and lease or purchase coal mines which they would operate, so as to provide the members with their coal requirements at cost, as well as to take care of the requirements of their employees. Several mines of large capacities lying close to the city are being considered by a committee of the association. The secretary is assembling data, as to the annual requirements of each of the members, cost of coal at this time, storage capacities, etc.

Charleroi, Penn.—Warrants charging manslaughter have been issued against four men following the death of Charles Otto, a 16-year old trapper boy in the Eclipse mine, who it is claimed, was hazed to death. Although Otto's death was due to meningitis, it is claimed the treatment which the boy was forced to endure at the hands of four men employed in the mine brought about the fatal ailment. That his head was butted against a trap door in the mine, that he was whipped with a blacksnake when he did not supply his tormentors with "tobies," that he was stripped of his clothing and his body smeared with grease, that his head was held in a barrel of water until he almost drowned, and that at other times he was otherwise mistreated, were some of the charges which the boy made to his father and the authorities just before he died.

Dunmore, Penn.—Charging that Louis N. Jaffe, a New York lawyer, makes a business of bringing trespass suits against coal companies in New York state courts, the Pennsylvania Coal Co., on Dec. 20, succeeded in securing an injunction restraining Andrew Burke, minor son of Michael Burke, from continuing his suit against the company before the supreme court of the State of New York. The bill the company filed, charged that the action was started in New York state to inconvenience the defendant company and in the hope that a large verdict would be secured because the New York courts are not familiar with the business of mining coal. Burke was employed as a headman by the defendant company and was injured in one of its mines Nov. 30, 1914. Several weeks ago, through Attorney Jaffe, he brought suit before the supreme court of New York for damages.

Urbana, Ill.—The senior mining engineering students of the University of Illinois, under the direction of Professors H. H. Stock and E. A. Holbrook, have completed their annual inspection trip to the mines in the state. This year the party went to Springfield, where the new Marcus screening equipment of the Woodside Coal Co. was inspected, then the Capitol was visited and the members met Governor Dunne and saw the offices of the State Mining Board. Afterwards the crew at the state mine-rescue station gave a demonstration. The following day the lead smelter at Collinsville and the Laclede byproduct coking plant at St. Louis were visited. After several days in the lead mining district in southeastern Missouri, the party established headquarters at the state mine-rescue station, at Benton. From here inspection trips were made to the new North Mine of the Christopher Coal Mining Co. at Christopher and to the new mine of the Middle Forks Mining Co. near Benton. Finally, trips were made to the Orient mine and surface plant of the Chicago, Wilmington & Franklin Coal Co. and to the surface plant of Old Ben No. 9 at West Frankfort. J. F. Jones, state inspector of the district, explained methods of mine inspection.

Louisville, Ky.—In an effort to obtain access to markets north of the Ohio River and west of the Mississippi, the Ohio Valley Coal Operators' Association, composed of western Kentucky operators, has instructed its attorney, J. Van D. Norman of Louisville, to file a complaint against the Illinois Central R.R. with the Interstate Commerce Commission. The bill will ask that the commission establish through and joint rates from all western Kentucky mines on both the Illinois Central and the Louisville & Nashville railroads, into the territory referred to. The operators complain that they have never had the opportunity to compete in this territory because of the influence of the southern Illinois mines. For this reason they have had to find their market largely in Tennessee and western Kentucky, into which territory rates are quoted from southern Illinois. At the meeting in Louisville on which the decision to go before the commission was reached the continued short supplies of cars then furnished the Illinois Central mines was the subject of discussion, and it was suggested that action in the state courts against the Illinois Central might be undertaken. W. A. Wickliffe, of Greenville, Ky., president of the association, presided at the meeting.

Market Department

GENERAL REVIEW

Storms and inclement weather delay movement and accentuate anthracite shortage. Bituminous market under heavy strain and liable to a severe upset. Transportation difficulties the worst of the season, with numerous embargoes. Middle Western buyers bidding spot prices up to prohibitive levels.

Anthracite—The recent cold weather has caused an enormous consumption, while production and movement have been much interrupted by the holidays and storms, and the market is very firm. There is practically no surplus coal at any of the distributing centers, and higher prices have been quoted, both wholesale and retail, with no diminution in business. Operating interests still insist that they will be able to furnish adequate supplies, though they are impressing the dealers with the necessity of influencing consumers to switch their orders from the short sizes. The slow movement is accentuating the difficulties materially, and it will take some time after the first of the year before there are any prospects of normal conditions being restored. Supplies at Tidewater have practically disappeared. The situation is somewhat better in the vicinity of Lakes, due to the closing of navigation; supplies are a trifle easier in that section, though shippers do not expect to entirely satisfy the buyers.

Bituminous—The fuel supplies at many industrial plants are down to a smaller margin than at any time this season, and there have been even occasional instances where it has been necessary to suspend operations temporarily. The car supply situation is more serious, still further restricting mine operations, while a number of new embargoes of various descriptions have been placed. Large orders for reserve stocks to carry over the holiday shortage, together with a more urgent demand from the West, have also tended to stiffen the market. The situation is under a more severe strain than is probably generally appreciated and the equilibrium of the market is liable to a radical upset at any time. Free tonnages of any size are practically unheard of and many industrial plants are running on very narrow margins.

Ohio Valley—With transportation difficulties so accentuated that even the mails are very much delayed, conditions in coal shipping have been at the worst. For instance at Cleveland, Ohio, arrivals are only about 250 cars per day as compared with 750, the average requirement. The recent cold snap is described as the most severe and most persistent that ever occurred at some points, and there has been a very urgent demand for emergency shipments. Stocks are much depleted, and there is little encouragement for increasing them in the immediate future. Embargoes of all descriptions are being declared, and the whole of Eastern Canada is embargoed against both anthracite and bituminous coals. Some iron furnaces have been compelled to suspend because of the scarcity of coal and coke. It is clear that a continuation of existing conditions much longer will cause a return of the high prices of October and as it is, quotations have already responded rapidly to the changed conditions. There has been little of a definite character developed concerning new contracts, though we note short term business that will probably be negotiated at slightly over twice the existing price.

Middle West—Cold weather and very serious delays in transportation have stiffened the market up sharply. There has been acute congestion at the railroad terminals, and Federal and state authorities have taken vigorous action to remedy conditions. The car shortage on some lines is reported as the worst in the history of the roads, some of which are furnishing cars only for the movement of their own supply. Far Western roads are buying coal in this district at prices in excess of the local retail quotations. A number of industrial plants have closed down in the hopes of accumulating some supply during the holiday period, which will enable them to resume operations next week. The most strenuous efforts were necessary to obtain sufficient coal to keep the Chicago schools going until they closed down for the holidays on Friday of last week. Severe weather has again created an urgent demand from outside markets, particularly in the Northwest, and very quick action has been necessary on occasions to avoid actual suffering. Buyers from outside points are bidding prices up to prohibitive levels. A short production over the holiday period will only accentuate the difficulty, and a continuance of cold weather will soon precipitate some spectacular price advances.

A Year Ago—Increase in the anthracite circular and shippers have unlimited orders. Bituminous becomes more confused as the season advances. Seaboard demand a factor at interior points. Middle Western situation firm, though quiet.

Comparative Average Coal Prices

The following table gives the range of mine prices in car lots per gross ton (except where otherwise noted) on 12 representative bituminous coals over the past several weeks and the average price of the whole group for each week:

Boston	Last Year	Dec. 30	Dec. 23	Dec. 16	Dec. 9	Dec. 2
Clearfields.....	\$2.50@3.25	\$4.75@5.75	\$4.75@5.75	\$4.75@5.75	\$4.75@5.75	\$4.75@5.75
Cambrias and Somerset.	2.85@3.25	5.25@6.25	5.25@6.25	5.25@6.25	5.25@6.25	5.25@6.25
Pocah. and New River ¹	2.80@2.90	7.25@8.00	7.00@7.50	7.00@7.50	7.00@7.50	7.00@7.50
Philadelphia						
Georges Creek.....	2.85@3.00	6.00@6.25	6.00@6.25	6.00@6.25	6.00@6.25	6.00@6.50
W. Va. Freeport.....	2.50@2.60	5.00@5.25	5.00@5.25	5.00@5.25	5.00@5.25	5.00@5.25
Fairmont Gas mine-run..	1.75@1.85	5.25@5.50	5.25@5.50	5.25@5.50	5.25@5.50	5.25@5.50
Pittsburgh (steam coal) ²						
Mine-run.....	1.25@1.35	4.25@4.50	4.25@4.50	4.00@4.25	4.25@4.50	4.25@4.50
4-in.....	1.35@1.45	4.25@4.50	4.25@4.50	4.00@4.25	4.25@4.50	4.25@4.50
Slack.....	1.00@1.05	3.50@3.75	3.50@3.75	3.50@3.75	4.00@4.50	4.25@4.50
Chicago (Williamson and Franklin Co.) ³						
Lump.....	1.60@1.75	3.75@4.50	3.75@4.25	3.00@3.50	3.50@4.00	3.50@4.00
Mine-run.....	1.10@1.15	3.75@4.00	3.50@3.75	3.00@3.25	3.50@4.00	3.50@4.00
Screenings.....	.80@.85	3.75@4.00	3.50@3.75	3.00@3.25	3.50@3.75	3.50@3.75
Gross average ³	\$1.86@2.04	\$4.73@5.19	\$4.67@5.08	\$4.48@4.90	\$4.69@5.15	\$4.71@5.12

¹ F.o.b. Norfolk and Newport News. ² Per net ton. ³ The high st average price for the year was \$4.80@5.33 made on Nov. 25.

BUSINESS OPINIONS

Bradstreet—Talk of peace in Europe has had a fourfold effect. It has produced uncertainty regarding the time when peace may come to pass, developed conservatism as to new far-off business, tended to shade heretofore highly-keyed views as to prices and buying, and for a spell caused widespread liquidation in speculative market quotations. In sum the net result has been of a sobering character, bringing in its wake less marked speculative ambitions, more temperate views as to the permanency of present high prices, and a stronger tendency to look to fundamentals as they would be if peace actually eventuates in the near future. But so rapid is the momentum of nearby trade with our industries sold far ahead, that rumors of peace have failed to stay the pace of current movements. Special investigation, in fact, reveals that while some lines have quieted down, this has as often been the result of seasonal influences, or, as in the case of cotton goods, some lines of which are quieter and easier, a desire to ascertain where cotton, which, theoretically, should be benefited by peace talk, but has not been, will reach an equilibrium as regards prices.

Dun—Coming at a period when a slowing down process is customary in most branches of business, the effects of the new international uncertainties have been appreciably lessened, though the lull natural at this season in many lines of trade and industry is somewhat accentuated. Readjustments in speculative channels have continued and certain commodities other than farm staples display signs of yielding, while increased prudence also is shown by buyers in entering upon commitments for the far future. Yet this is a wholesome tendency and is welcomed by producers, with the works nearly everywhere covered by contracts for months ahead and pushed to their utmost capacity to meet requirements. Commercial failures this week in the United States are 286, against 293 last week, 333 the preceding week, and 391 the corresponding week last year.

Dry Goods Economist—The majority of the stores in the metropolitan district had a brief but phenomenally active Christmas trade. Officials who spoke most enthusiastically as to the business, however, made the reservation that an appreciable part of their sales increase was due to the enhanced prices of the merchandise. One merchant expressed decided apprehension as to the curtailment of sales later on by the continuance of high prices. Some department heads who were interviewed complained of the loss of many sales through their having run out of certain sizes or patterns, the merchandise man having forbidden filling-in because the department had bought up to its allotment. In other cases, sales were lost because the right goods could not be obtained.

Marshall Field & Co.—Current wholesale distribution of dry goods has been much in excess of the corresponding period of past years. Road sales have been running in larger volume than for the same week 1915. More customers have visited the market than in the same week a year ago. Collections continue to maintain the very large volume of the past few weeks.

Atlantic Seaboard

BOSTON

Pocahontas and New River shippers barely able to keep up with consignees' requirements. No improvement in Tidewater receipts and slow loading now the rule. Georges Creek shipments meager. Pennsylvania operators begin quiet canvass for contracts, but only on very small scale. Anthracite shipments slower than ever.

Bituminous—Reduced car-supply and slow movement on the railroads continue to keep Hampton Roads receipts at a minimum. Practically all the agencies are now obliged to confine themselves strictly to contract and other obligations that involve loading steamers and barges on a season basis and instances of spot sales by such interests are increasingly rare. Small lots are still being sold by the smaller factors and such sales are on the basis of \$7.25@8, but practically no cargo lots are reported.

The whole situation on Pocahontas and New River is under severe strain; if it were a little worse the condition would be acute and prices would go soaring. As it is, something like an equilibrium is maintained by sending coal forward just about as fast as it is used. With a large number of New England plants the margin of safety is very small and deliveries from other sources are as a rule less dependable than those from Hampton Roads.

Rehndlers at this end are also hard put to it to keep consumers supplied. Points normally reached by boats direct from the loading piers are in many instances given hand-to-mouth deliveries by lighter from Boston or Providence. Steamers not content to be served in this way try occasionally to buy cargoes on the market, but the latter are now practically unheard of.

A succession of storms has further handicapped coastwise movement and should mining be suspended for a longer holiday period than usual there will probably be some "developments" in this territory. Spot coal is still being sold on cars at points like Boston, Portland and Providence at prices well up to \$10. The volume sold is small and sales spasmodic.

Nothing new can be reported on 1917 contract business. So far, no definite moves have been made by any of the agencies in the way of actual sales, but no doubt most of the comprehensive buyers have been "sounded." It would not be strange if there were "understandings" between seller and buyer under which present contracts might be extended, the price to be adjusted from time to time. The low range on which present obligations are being fulfilled will surely be an argument. There are rival interests in this market, however, and the procedure will be followed with interest by all observers.

A few arrivals of Georges Creek cargoes have served to call attention to the hard situation of most of the plants who have contracts on this grade. By shipping other coals from Baltimore and from Norfolk the principal Georges Creek shippers have been able to demonstrate their readiness to do whatever is open to them to make good the arrears on contracts, caused largely by poor car-supply and lack of miners. Receipts continue extremely light at Baltimore, and only small and scattering amounts are available at either New York or Philadelphia.

Tidewater deliveries of the Pennsylvania grades are also in very light volume. The uncertain movement of boats is only one of the reasons why operators shun the loading piers, and apparently the same attitude will prevail in 1917, or as long as the present congestion continues. If water freights are on the basis of \$2 or more to Boston, the rate of \$2.60 to Boston points all-rail from the mines is bound to come more into requisition if the railroads can handle the tonnage. Meanwhile, business nearer the mines will have the preference, so far as consistent with car distribution.

Spot prices f.o.b. mines have changed very little in three weeks. Some predict higher prices around New Year's Day, but all-rail shipments to this territory have been so slow that spot buyers within access of Tidewater coal are more inclined to pay the difference.

Bituminous at wholesale is quoted about as follows, f.o.b. loading ports at points designated, per gross ton:

	Clearfields	Camb. & Somerset
Philadelphia.....	\$6.00@7.25	\$6.50@7.50
New York.....	6.25@7.40	6.75@7.75
Baltimore.....	4.75@5.75	
F.o.b. mines.....		
Alongside B. St. n. (wat. r. coal).....	8.00@8.75	8.40@9.25

Pocahontas and New River are quoted at \$7.25@8 f.o.b. Norfolk and Newport News, Va., for spot coal, and \$9.50@10 on cars, Boston and Providence for inland delivery.

Anthracite—Storage coal has now been pretty well worked off and with most of the companies the Tidewater, loading is now down to daily receipts. Dumping is slow at all points. Barges are subject to all manner of delay, and the outlook is generally discouraging for New England retailers. The cold weather is using up stocks faster than they are being replenished. Shippers have had such alarmist reports all season from this territory that they are getting calloused, and rest on their assurances that they are doing the best they can.

"Independent" shippers are hampered by the shortage of suitable boats and high freights at Tidewater, but all-rail they are doing a thriving business; \$5.60 for chestnut a week ago was about the price f.o.b. mines, but since then \$6.50 has been paid, and \$7 for stove.

Rice and barley sizes are in strong demand, although the demand on the companies for domestic sizes is so great that only a few barges are being spared for steam grades.

A 1200-ton barge loaded for Boston on the Dec. 21., having reported for domestic sizes on Nov. 14.

The following table compares prices on anthracite steam sizes, with corresponding prices a year ago:

	Circular	Individual
Buckwheat.....	\$3.60	\$6.00@6.50
Rice.....	3.10	5.50@5.75
Boiler.....	2.95	5.00@5.25
Barley.....	2.85	4.20@4.60

PHILADELPHIA

Anthracite trade stiffened up by winter weather. Retail men offer more premiums. Railroads badly congested. Short working time expected to reduce production. New retail price schedule. Bituminous quotations stationary but increases expected. Rumors of contract prices.

Anthracite—During the most severe weather the trade has yet experienced brought all the trials predicted. The situation became most acute after the second and heaviest snowfall. Many dealers unable to care for their own trade satisfactorily refused all business from would-be purchasers unknown to them. Buyers whose regular dealers could not supply them with the desired sizes found difficulty in placing orders and much "shopping" was necessary. Even on such business as was taken it was only delivered with the greatest difficulty and expense, owing to heavy going in the streets.

It is really felt that the situation is serious with the dealers' stocks at low ebb and no encouragement to be had from any of the shippers. The operators still insist that there is no danger of a coal famine, but they impress upon the retailer the importance of influencing their customers to do their part in relieving the stress by accepting such sizes as are in stock. The dealers long ago responded by turning considerable of their trade on egg, and manufacturers, that ordinarily demand broken coal are really managing to get along with this size.

That the local trade has actually become alarmed is evidenced by its willingness to pay premium prices. Conservative dealers are offering shippers 50c. and in extreme cases as high as \$1 per ton above circular, but with little success. The manner in which offers of 50c. per ton are being scorned makes it apparent that other markets offer higher rates.

This does not apply to all individual shippers, inasmuch as there are quite a number who are taking even better care of their trade than many of the large companies. As a matter of fact the greatest quantity of premium coal being sold here comes from one of the larger producing companies, though the sales are solicited by one of the middle houses.

Another exasperating feature is the long delay in receiving coal. Both the Pennsylvania and Reading railroads seem equally deficient in this respect. After notices of shipments have been received consignees often wait ten days or more for the coal. The delays toward the end of the week became particularly acute owing to the extraordinarily heavy Christmas traffic, which at times completely blocked the freight movement. The Christmas holidays made the production even shorter than usual and there is very little likelihood that anything like normal conditions will be restored until after Jan. 1.

The demand for all sizes continues out of all proportion to the production. Stove coal is the shortest as usual, and even pea coal is reaching the stage where some dealers are actually short. During the past ten days there has been a vast quantity of coal consumed on account of the cold and snowy weather and it is such a time as this the real demand for pea begins to assert itself.

About the middle of last week, the Geo. B. Newton Coal Co., the largest retailers announced that taking effect at once they would add 25c. to the price of all sizes. Several of the other large companies quickly followed suit, and by the end of the week practically all the dealers in the city adopted the new scale. The retail schedule as now in effect is as follows: Egg, \$7.75; stove, \$8; chestnut, \$8.25; pea, \$6. These are strictly cash prices, with an addition of 25c. where the coal must be carried into customer's cellar.

The steam grades continue in extremely active demand, particularly by the bituminous consumers who are mixing these sizes with soft coal.

The prices per gross ton f.o.b. cars at mines for line delivery and f.o.b. Port Richmond for tide are as follows:

	Mines Tide		Mines Tide
Broken.....	\$3.60 \$4.75	Buck.....	\$2.00 \$2.90
Egg.....	4.15 5.25	Rice.....	1.25 2.15
Stove.....	4.10 5.60	Boiler.....	1.10 2.00
Nut.....	4.50 5.55	Barley.....	1.00 1.90
Pea.....	2.80 3.70		

Bituminous—There have been some increases in price this week, though on the whole the recent figures are still effective, with a considerable quantity of coal selling around the \$8 mark. It is felt, however, that even these figures will show a substantial increase by the first of the year. The Baltimore & Ohio R.R. recently issued an order embargoing all shipments originating on their road for foreign lines, claiming that they are so congested with freight as to hold the shipments of B. & O. coal at the junction points. The supplies reaching the city were none too heavy and with the holiday season at hand the usual restriction of output due to this cause will soon be felt.

In addition a number of the operators are now facing a probable strike in the Western Pennsylvania district where the miners have demanded an increase of pay. Quite a number of the producing companies are living strictly up to their contract obligations so far as price is concerned, although they are having great difficulty in doing so. For such concerns to grant a large increase would be ruinous and if the miners insist a strike will be the only result.

In the face of all these conditions, people who are most in need of coal, particularly the larger buyers, hesitate to purchase at the prevailing figures, as they expect prices to recede considerably after the first of the year. Many of the plants here are running on a closer margin of fuel supply than they have all season and occasionally there are short shut-downs on account of a lack of coal.

While the market has been anxiously awaiting some announcement as to a new contract figure, it cannot be learned with any certainty as to whether any business is being done, although it has been reported that some of the larger companies are offering to contract for \$3. As yet we have been unable to verify this report.

The following table gives the prices prevailing per gross ton f.o.b. cars at mines:

Georges Creek Big Vein.....	\$6.00@6.25
South Fork Miller Vein.....	6.00@6.25
Clearfield (ordinary).....	5.25@5.50
Somerset (ordinary).....	5.25@5.50
West Va. Freeport.....	5.00@5.25
Fairmont gas, lump.....	5.50@5.75
Fairmont gas, mine-run.....	5.25@5.50
Fairmont gas, slack.....	4.50@4.75
Fairmont lump, ordinary.....	4.75@5.00
Fairmont mine-run.....	4.50@4.75
Fairmont slack.....	4.50@4.75

NEW YORK

Anthracite demand increased. Supplies scarce and no improvement expected until after Holiday season. Mines working slow. Bituminous in heavy demand and railroads are stocking up in anticipation of low production. Prices advance.

Anthracite—Increased demand and lack of supplies were the chief features of the week in the Anthracite situation. These were due principally to lower temperatures and the holiday season which always results in curtailed production. Consumption has increased considerably but dealers did not go into the market

unless actually forced to do so, because of the high prices.

Notwithstanding this the market was pretty well cleaned up the first of the week. Several of the mines were idle the last couple of days of last week and as Monday was a holiday it was Wednesday before many of the mines resumed operations, and Thursday before any fresh-mined coal was received at Tidewater.

The last week of the year opened with the loading docks nearly free of all prepared coals. Shippers with urgent orders went scurrying from one office to another on Tuesday looking for supplies but met with little success. Free coals brought stiff prices, or were held for future business. Loaded boats were quickly picked up, even those containing the small sizes. It was said that the demand was the heaviest known in the trade when quotations were below \$12.

Broken continues to be scarce, hardly enough to take care of contracts being received here. Egg and stove are scarce both for line and Tidewater delivery.

Chestnut is tight and becoming still tighter. Quotations are on the same basis as for either egg or stove, but dealers are not so anxious to buy this size, most of them having some on hand.

The steam coals have stiffened and are in heavy demand with indications pointing to a continued scarcity and higher quotations.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken.....	\$4.95	
Egg.....	5.45	\$8.25@8.50
Stove.....	5.70	8.25@8.50
Nut.....	5.75	8.00@8.25
Pea.....	4.00	6.00@6.50
Buck.....	2.75	5.25@5.50
Rice.....	2.20	4.25@4.50
Barley.....	1.95	3.45@3.70
Boiler.....	2.20	

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—Lower temperatures and the efforts of large consumers to stock up for the holiday season, has caused a decided stir in the bituminous market. Last week's storms interfered greatly with transportation facilities and deliveries were delayed. Car supply at the mines was much worse and those mines that would have been able to work part of the time were in some instances forced to shut down altogether. The railroads have also been stocking up in anticipation of small production leaving the market practically clear of spot coals.

The urgent call for supplies from Western consumers who are facing a suspension of operations at their plants has caused Western Pennsylvania operators to send additional tonnage in that direction. Salesmen are urging consumers to buy at the present prices, only as necessity requires, holding out the hope that when the mines resume full operations after the first of the new year lower prices will prevail. There are shippers however who predict still higher prices at that time.

The week opened with demand brisk and no coal on hand to meet it. Prices were stiff. There was a brisk call from New England for water shipments but freight charges were high and few boats to be had.

Current quotations, per gross ton, f.o.b. Tidewater, for various grades are as follows:

	South Amboy	Port Reading	Mine Price
Georg's Crk.....			
Big Vein.....	\$7.75@8.00	\$7.75@8.00	\$5.75@6.00
Tyson.....	7.50@7.75	7.50@7.75	5.50@5.75
Clearfield.....	7.50@7.75	7.50@7.75	5.50@6.00
South Frk.....	7.75@8.00	7.75@8.00	5.50@6.00
Nanty Glo.....	7.75@8.00	7.75@8.00	5.50@6.00
Som'r. Co.....	7.50@7.75	7.50@7.75	5.50@5.75
Que'ho'ing.....	7.75@8.00	7.75@8.00	5.50@5.75
W. V. Fa'rmt.....			
Th'r'qua.....	7.50@7.75	7.50@7.75	5.25@5.50
Mine-run.....	7.50@7.75	7.50@7.75	5.25@5.50
West. Md.....	7.50@7.75	7.50@7.75	5.50@5.75

Ocean Shipping

OCEAN FREIGHTS

The tonnage scarcity has become acute, and notwithstanding the fact that shippers of coals to the River Plate, West Coast of South America and the Mediterranean continue to offer higher rates than recently quoted, vessel owners do not respond, and chartering is almost at a standstill. A few steamers are available, for Brazil coals at rates considerably higher than last paid, and also a few boats are open for Cuban and West Indian cargoes, but in nearly every instance also at advanced rates. It is too early to predict what effect the recent British Government's ruling will have upon the freight market, but it certainly will add to the confusion if nothing more.

We would quote freight rates on coal by steamer as follows:

	Dec. 18	Dec. 26
West Coast Italy....	\$33.60@36.00	\$39.60@42.00
Marseilles.....	31.20@33.60	38.40@40.80
Barcelona*2.....	30.00 about	31.20@33.60
Montevideo.....	18.00@19.20	19.20@21.60
Buenos Aires.....	18.00@19.20	19.20@21.60
Rosario.....	20.40 about	20.40@23.00
Rio Janeiro.....	16.00 about	16.00@17.00
Santos.....	16.50 about	17.00 about
Chile (good port)....	9.00 about	9.00@10.00
Havana.....	4.00 about	4.50@5.00
Cardenas, Sagua....	5.00@5.50	5.00@5.50
Cienfuegos.....	6.00@6.50	6.00@6.50
Port au Spain.....	8.25@8.50	8.00@8.50
St. Lucia.....	8.25@8.50	8.00@8.50
St. Thomas.....	7.50@7.75	7.50 about
Barbados.....	8.25@8.50	8.00@8.50
Kingston.....	6.50@7.00	6.75@7.00
Curacao1.....	7.25@7.50	7.00@7.25
Santiago.....	6.00@6.50	6.00@6.50
Guantanamo.....	6.00@6.50	6.00@6.50
Bermuda.....	5.00@6.00	5.75@6.00
Vera Cruz.....	8.25 about	8.25 about
Tampico.....	8.25 about	8.25 about

* Spanish dues for account of cargo. 1 And p.c.

2 Or other good Spanish port. 3 Net.

Note—Charters for Italy, France and Spain read:

"Lay days to commence on steamer's arrival at or off port of discharge."

W. W. Battie & Co.'s Coal Trade Freight Report.

OCEAN CHARTERS

Coal charters have been reported as follows during the past week:

Vessel	Destination	Tons	Rate
Munro	Havana	2,439	
Orkild	Havana	1,622	
Ellen	Marseilles	3,474	
Ronald	Valparaiso	2,766	
Cami l. M. Page	Jamaica	567	7.00
Wm. C. Downes	Bermuda	639	5.25
Wm. M. Critchett	Guadaloupe	471	
Juan	Truxille	841	
Levisa	Banes	1,259	

* Coke.

VESSEL CLEARANCES

The following vessels have cleared with coal cargoes during the past week:

Vessel	Destination	Tons
Oeland	Havana	1,874
Orkild	Havana	1,622
Thelm	Guantanamo	
Florenzia	Santa Cruz del Sur	
Florence Creadick	Cardenas	
Nicholas Cuneo	Cuba	
Ellen	Marseilles	3,474
Munro	Havana	2,439
Andrea Costa	Italy	5,018
Louis K. Thurlow	Cuba	3,802
Edward R. Smith	Barbados, B.W.I.	793
Narvik	Norway	6,208

COASTWISE FREIGHTS

Few charters are being made from any point, and perhaps fewer from Hampton Roads than from any other ports; \$2@2.25 is quoted, but it is extremely difficult to get vessels accepted.

There is no change in barge rates from New York to Providence and similar points; \$1.25@1.35 is the range, but few boats are taken because of the difficulty in arranging loading.

Lake Markets

PITTSBURGH

Transportation conditions still worse. Coal offerings much less than enquiry. Higher prices paid. Worse conditions expected.

Transportation facilities have almost completely fallen down. There are embargoes against shipments to various points and there are car shortages, while when loaded cars are accepted their movement is usually extremely slow. The Pittsburgh & Lake Erie's embargo is the most complete possible, as it is against anything and everything that would move off its lines at any point. The Pennsylvania has relatively few embargoes, but it is very short of cars.

There is a decided scarcity of labor this week, or would be if there were facilities for moving coal, but as it is the limited number of men available is approximately sufficient to mine the coal that can be moved.

Shipments against contracts are far below requirements, and regular customers are nearly all enquiring in the spot market. They are interested in spot coal and not in nearby deliveries, not even deliveries over January. Today there have been enquiries from probably not less than half a dozen steel companies, in the local coal market, for lots of from 25 to 100 cars, and scarcely any of this has been quoted upon.

There are some transactions, but the volume is far below what there should be to make a regular market. Probably some consumers would pay higher prices than have been paid, if they could get coal, while doubtless some shippers would sell at much less, if there were buyers at the few points to which they could ship. Transactions made have been at the following prices: Slack, \$5; steam, mine-run, \$5@5.25; 3/4-in. gas, \$6@6.25, per net ton at mine, Pittsburgh district.

All the indications are that conditions will be worse before they are better.

BUFFALO

Bituminous prices stronger on account of scarcity and light production during holidays. Anthracite doing well, but demand strong as ever.

Bituminous—Reports agree that the coal on track here, is about cleaned up, so that it is not easy to fill orders. The car supply is at its worst. There are not only route embargoes, but embargoes against other roads and against slow shippers; in fact the roads are trying every expedient to get shipments forward and out of the way. Some roads are refusing for several days to let their cars go off their lines and if a shipper is slow in handling consignments he is blacklisted.

Every railroad leading into Canada is embargoed, on both anthracite and bituminous and the Eastern routes are not much better off. And now reports begin to come in of furnaces shutting down because of inability to get coal and especially of coke. If the miners remain idle for sometime, as is predicted, the coal supply will soon be far below the needs of consumers. In that case a return of the exceedingly high prices of October may be expected, unless the peace rumors have an opposite effect. All reports from Pittsburgh are exceedingly bullish and prices are somewhat higher than a week ago. At present quotations are as follows:

Youghiogheny Gas.....	\$6.50@7.00
Pittsburgh Steam.....	5.75@6.25
Ohio No. 8.....	5.75@6.25
Cambria Co. Smithing.....	5.65@6.15
Allegheny Valley.....	5.50@6.00
Pennsylvania Smokeless.....	5.70@6.20
All Slack.....	5.10@5.60

All prices are per net ton, f.o.b. cars at Buffalo. Slack is exceedingly active and No. 8 is nearly out of market on account of embargoes.

Anthracite—The demand does not abate, though the supply has considerably increased since the closing of the Lakes. Shippers do not expect to satisfy consumers, though they are now giving out more coal on single orders than they were. The independent premium is from \$2 to \$3 and not likely to advance. There is a decided scarcity of stove, but all other sizes are running pretty evenly. While there are about as many consumers asking for coal there is no sign of panic, as was the case last fall. Unless some new reason for uneasiness arises the stress will pass slowly off, with a moderately cold winter.

Contrary to the usual custom no effort will be made to put any coal afloat till it is certain that the local consumers are fairly well supplied for the winter. At the same time the upper-lake territory will need coal as soon as it can be had by Lake next season.

Within the past week some Eastern jobbers handling standard coal have advanced a few cents on a few sizes, but that appears to have been merely to bring them into line with certain others who made a similar advance some weeks ago.

TORONTO, CAN.

Coal supply still short. Railroad deliveries held up by embargoes. Demurrage question unsettled.

There is no appreciable change in market conditions excepting an increased demand caused by colder weather. Supplies are still coming forward slowly owing to railroad embargoes and dealers deliver as a rule in small quantities direct from cars.

The Railway Board has not yet given its decision regarding the proposed new demurrage scale as affecting coal. The larger dealers having good storage facilities are disposed to favor an increase in demurrage rates as a remedy for car shortage, but are opposed to a reduction in the free time allowed for unloading.

Quotations for best grades per short ton are as follows: Retail anthracite, egg, stove and nut, \$9; grate \$8.75; pea, \$8; bituminous steam, \$11; slack, \$9; domestic lump, \$10; cannel, \$10; wholesale f.o.b. cars at destination, bituminous three-quarter lump, \$8.50; slack, \$7.25. Pocahontas smokeless run-of-mine \$8.50. Pennsylvania smokeless, run-of-mine, \$8.

DETROIT

Demand for steam coal strong and supply scarce. Cold weather brings larger inquiry for domestic stock. Serious shortage threatens.

Bituminous—Industrial plants and consumers of domestic coal maintain an active buying movement despite the present high prices. Strength of the demand is reflected in a 50c. advance in mine quotations on nut, pea and slack, which is now held at \$4.50, with the supply very short. Mine-run is selling at about the same price, though the demand is less active than for slack. Three-quarter lump is quoted around \$4.50 to \$4.75 at the mines.

Larger and more urgent demand for domestic sizes is developing with the long continued period of low temperatures. While some coal is coming into Detroit every day, the receipts scarcely offset consumption. Stocks in retail yards are much depleted and with the congestion and car shortage on transportation lines, the outlook is causing considerable anxiety.

Anthracite—Detroit is getting very little coal and supplies are being rapidly reduced by the larger consumption. Practically all retailers are limiting deliveries to a maximum of one or two tons to each buyer. While none of the principal sizes is being received in a quantity commensurate with requirements, stove coal appears more difficult to get than either chestnut or egg. In some parts of Detroit consumers are reported paying \$12 a ton for chestnut in contrast with a price of \$8.75 a ton in September.

CLEVELAND

Stormy weather and railroad embargoes curtailing receipts. Natural gas shortage forcing large manufacturing plants to burn coal.

The stormy weather and the railroad embargoes have curtailed the coal receipts more than 50% in this market and the shortage became more acute. Only about 250 cars are coming in daily while the normal requirements average 750 cars. Consequently the price of both domestic and steam grades, has advanced considerably; in fact jobbers who had coal on track could secure almost any price they cared to ask. On account of the natural gas shortage many large manufacturing plants are changing to coal, in order to conserve the gas supply for the domestic consumer, and this has created a larger demand for the steam grades.

Following are the market prices per short ton, f.o.b. Cleveland:

	Three-quarter	Mine-run	Slack
No. 8.....	\$7.00	\$7.00	\$6.75
Cambridge.....	7.00	7.00	6.75
Middle Dist.....	7.00	7.00	6.75
Hocking.....	7.00	7.00	6.75
Yough'gheyn	No quotations made		
Pittsburgh.....	No quotations made		
Pocahontas.....	7.50		
Fairmont.....	No quotations made		

TOLEDO

Car congestion makes conditions bad at Toledo. Northwestern Ohio suffering through coal shortage.

The coal situation here is getting tighter as the cold weather closes in. The car situation is now extremely bad and even mails both in and out of Toledo are badly delayed. Coal dealers are inclined to blame the bad situation on the railroads. Detroit is also badly congested and is backing up cars into Toledo. There are embargoes on practically all the roads and little hope of any relief in sight.

Generally the closing of Lake navigation releases a large amount of coal but there was an unusually small supply left at the docks and this was reconsigned and sent to the owners by rail. There is no such thing as a price list and sales are regulated entirely by the law of supply and demand. It is said that there is not a manufacturing or power plant in Toledo that has more than a week's supply of coal on hand. The Toledo Railways & Light Co., has agents scouting over the country offering premiums in an effort to secure supplies. The failure of this concern to secure adequate supplies would mean not only the stopping of street cars but the loss of electric lighting.

It is feared that real suffering will result should the cold and snowy weather continue for long. Cities throughout Northwestern Ohio are already suffering. The failure of gas in Fostoria made the situation more serious and the same thing was true for a few days in Toledo; the natural gas ran so low that fires went out in many sections of the city on the coldest days. Pocahontas coal is scarce. Local wholesalers have not taken any orders for this grade since early fall, some not having taken any since the middle of August. No Pocahontas is being delivered except on contracts.

COLUMBUS

Heavy storm causes a spurt and instills greater strength in the market. Prices respond rapidly and high levels are again reached. Supply short in many localities.

Domestic trade rules firm in every particular. Retail stocks are light as dealers were unable to accumulate much of a surplus during the warm weather, which preceded the present cold snap. Dealers are unable to take care of or-

ders because of short stocks and the icy condition of the streets, which prevents quick deliveries. In some instances stocks are almost exhausted. Retail prices are ruling high with firmness the chief feature and no cutting reported.

Bids have been asked by the city officials of Columbus for a coal supply for the various departments for January and February. Instead of contracting for six months as has been the custom it has been decided to get bids for a two months' supply only in the hopes that lower prices may prevail after that. It is believed that the city will be compelled to pay \$3 or more per ton for coal which is now being secured at about \$1.40.

Prices on short tons, f.o.b. mines are as follows:

	Hocking	Pomerooy	Eastern Ohio
Rescreened lump.....	\$5.00	\$5.00	
Inch and a quarter.....	4.75	5.00	\$5.00
Three-quarter inch.....	4.75	5.00	5.00
Nut.....	4.75	5.00	5.00
Egg.....	4.75	4.75	5.00
Mine run.....	4.50	4.75	5.00
Nut, pea and slack.....	4.50	4.75	5.00
Coarse slack.....	4.50	4.75	5.00

CINCINNATI

Continued severe weather has developed a shortage and prices are stiffening. Transportation difficulties the principal factor.

One of the most severe cold snaps in several years has brought about the usual emergency demand for fuel, and this market may face an actual shortage unless the movement from the mines is more rapid. Large quantities of fuel passing through Cincinnati to points beyond have created some adverse comment, and an official investigation of the situation is under way.

Many large industrial concerns have been cut off from their usual supply of natural gas, which has accentuated the steam demand, and the market for this grade is even stronger than for domestic grades. Quotations are reaching toward their recent high levels, with \$3.25@3.75 per ton f.o.b. mines for West Virginia splint as the nominal figures. Domestic grades of the same coal are sold at \$4@4.25 f.o.b. mine, but the car shortage prevents much selling. Kentucky coals, selling at about the same figure, are mostly out of the market for the same reason.

LOUISVILLE

Cold weather and holidays restricting production in Kentucky fields. Heavy January movement expected.

Arrival of severe cold weather has tended to increase the demand and stiffen the market, while the holidays has curtailed the output. The latter part of the week finds the miners returning pretty generally to work and heavy loadings are expected during January, provided the car supply is equal to requirements.

Eastern Kentucky prices, f.o.b. the mines, have ranged as follows: Block, \$3.50@4; mine-run, \$3.50@4.50; egg, \$3.25@3.75; screenings, \$3.25@3.50.

Western Kentucky shows no changes.

BIRMINGHAM

Railroads taking the bulk of the production. Other consumers getting a small supply. Prices remain firm and demand continues good.

The major portion of the production the past week has been taken by the railroads to tide them over the holiday season, and other classes of consumers have had to take what was left, which was materially short of their requirements. There has been no change in schedules over a week ago, prices on steam grades ranging from \$3.50 to \$4.50 per net ton f.o.b. mines. The demand for steam and domestic grades is fair, the latter being quoted at \$4 to \$5 per net ton at mines.

The car supply is gradually improving but is still quite an impediment to the production and movement of coal. Preparations are being made to increase the production considerably in the early part of 1917 by the opening of several new mines and improving the output at others.

Coke

CONNELLSVILLE

Transportation conditions much worse. Practically no spot coke. Many furnaces banked. Production light.

Transportation conditions have grown much worse and to this condition has been added an increased shortage of labor, due to the holidays. Some of the men are not through celebrating, according to our calendar, while the majority, of the Greek Church, who follow the Julian calendar, 13 days later than ours, are getting ready to celebrate. The seriousness of the situation as to coke movement, is seen by the fact that the Carnegie Steel Co., which has its own coke operations, has 20 of its 57 blast furnaces inactive, on account of coke, 14 of these having been banked in the past few days while the

others are blown out. It was hoped when the furnaces were banked they could be operated again after Christmas, but coke supplies are so poor this week that the number banked is as likely to increase as decrease.

As shipments under contract are far below the requirements there is practically no coke available to be sold in the open market. There are rumors of some coke being available but the average buyer could not afford to pay prices asked, particularly as this would afford only the most temporary relief from a situation that must be faced from a broader viewpoint. There is a rumor that \$11 has been quoted for spot furnace coke and refused, and another rumor that \$12 has been paid for 50 carloads. Foundry coke may be quoted nominally at \$12. One producer has none to spare and is quoting \$15. Contract prices are nominal at figures last quoted, \$4.50@5 for furnace and \$5.50@7.50 for foundry, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Dec. 16 at 375,501 tons, a decrease of 49,264 tons, and shipments at 362,293 tons, a decrease of 67,746 tons.

Buffalo, N. Y.—The coke market is more firm than coal, as the supply is decidedly less than the demand. All quotations will have to be made with the additional statement that consumers are about in condition to pay whatever is asked, as some have already shut down their furnaces wholly or in part, owing to inability to get coke at any price. Prices rule about \$8.85 for high sulphur and stock coke. The situation everywhere here is extremely unsatisfactory. Car shortage is chiefly accountable for the difficulty. It is hard to say whether the late snow storms have had much effect on the market, as the scarcity could hardly be accentuated.

Chicago—Both production and shipments of coke show a marked decrease, with prices sensationally high. All producers report being sold up, and merely nominal prices can be quoted on the small amount of free tonnage available. A further upward swing of prices is expected owing to shortage of free Eastern coal. Furnace and foundry sizes are much stronger than heretofore.

Nominal prices per net ton f.o.b. cars Chicago, are as follows:

Connellsville.....	\$9.00@10.00
Wise County.....	9.00@10.00
By-Product Foundry.....	9.00@10.00
By-Product Domestic.....	9.50@10.50
Gas House.....	8.00@9.00

Birmingham, Ala.—Prices of foundry and furnace coke continue at high levels, while the supply of free coke is very scarce. The available foundry is selling readily at \$10 per net ton ovens, and no quotations are to be had on furnace coke, as there is none for the open market, the last quotations ranging from \$5 to \$6 per net ton ovens.

Middle Western

GENERAL REVIEW

Wintry weather brings about a real coal shortage. Buying greatly increased. Holiday season aggravates the stringency. Average increase of prices 50c. per ton.

Under the influence of zero weather the market has become tight with demands for coal from all quarters. Arrivals of tonnage are below requirements, and prices will soon advance further because of shortage of production during the holiday season.

The cold weather also had a marked effect in slowing up the movement. Congestion of terminal facilities in the railroad yards of Chicago has added to the difficulties of the situation and numerous embargoes have been announced.

A number of industrial plants in Chicago and other western towns are short of fuel and can only obtain a hand to mouth supply. Chicago is very short of coal of all sizes and grades, but towards the close of the week a perceptible improvement was noticeable due to the terminal railroads making better headway in switching coal shipments. The Federal and state officials have been vigorously pushing the railroads to redouble their efforts to avert a coal famine by expediting the movement. The Chicago Belt Railway has been the worst offender, but towards the close of the week with the assistance of other roads, the congested district showed improvement. Public buildings, particularly the schools, have been very short of coal, some of them closing down because of lack of heat.

The State Public Utilities Commission summoned representatives of twenty-six railroads in conference who afterwards met in the offices of the General Managers' Association, and agreed to curtail other train movements to rush coal to Chicago. They agreed with the State Commission to go to the limit of their ability in clearing things up, and most of them appointed special representatives to superintend the speeding up of coal movement.

CHICAGO

Extreme shortage of supplies in Chicago. Cold weather increases consumption. Railroads handicapped by terminal congestions. Local prices much higher.

The advent of much colder weather has created an urgent demand for tonnage from all sections especially on the north side and actual suffering was only avoided by quick work in reconsigning shipments to that district. Some of the large office buildings have been practically out of coal. A number of industrial plants are short of supplies, and notwithstanding a superabundance of orders are closing down during the holiday week with the hope of accumulating some surpluses.

Extraordinary efforts have been made by carriers and terminal railroads to expedite the movement, and it is apparent that these are bearing fruit, since a slight improvement is noticeable. The increased demand, aggravation of the car shortage, lessened tonnage at the mines, and slower movement, is likely to make prices soar much higher next week.

Southern Illinois domestic lump has been selling as high as \$4.50 with screenings in some cases bringing \$4.25. The margin of difference in price on all grades is narrowing, so that outside of domestic lump, other spot sizes bring practically the same figures. Repeated calls for coal from foreign markets have been received by the Franklin County operators which could not be filled. The Saline County field is concentrating on contracts mostly, on account of very poor car supply. Country buying has been extremely urgent.

Central Illinois coals have shown remarkable strength, screenings and mine-run reaching as high as \$4, with domestic lump bringing around \$4.25. But little free coal is available from the Fulton and Peoria County districts, most of the tonnage of these mines being absorbed locally.

Indiana coal is selling over a much larger zone, and as a result all domestic sizes have sold up as high as \$4.25, with steam coals averaging \$3.75. Supplies of spot domestic and steam coals have been limited on account of the efforts of Indiana consumers to obtain shipments from home mines. The car supply has slightly improved at the Indiana mines this week.

Hocking and splint have been much stronger, with restricted arrivals. Kentucky prices are high, and the reconsignment restrictions continue to hamper movement to Chicago territory.

ST. LOUIS

St. Louis facing an actual coal famine, on account of supplies being diverted to Chicago and the North. Car supply the worst on record, and no prospects of getting better. Country demand still slow, but the general call exceeds the supply. Situation threatens to become serious.

The St. Louis market is facing an actual coal famine due to the fact that other places like Chicago and Omaha have been facing a fuel famine and depended on the supplies of St. Louis. Buyers from Chicago have been paying from 25c. to 50c. per ton more than the St. Louis market could stand, and they have cleaned out all the available coal from the Standard field and have drawn more than their share from the Williamson and Franklin County field.

With a letup in the industrial activity of a few days during Christmas the steam consumption will drop off, increasing the supply of domestic coal. There is no pronounced demand from the country as yet, but the first of the year will see a serious condition in that direction. This is attributed largely to the fact that equipment sent to the Northwest is slow in returning.

During the past week a fair tonnage of anthracite moved in, and some smokeless. Alabama coke in a few instances came into St. Louis and considerable moved through.

Shipments for the big cities in the North and West are still heavy on all grades of coal here, and the outside market is anywhere from 25c. to 50c. a ton over the local market, which is f.o.b. mines per short ton, as follows:

	Williamson and Franklin Co.	Mt. Olive and Staunton	Standard
6 1/2-in. lump.....	\$3.50	\$3.50	\$3.50
3x6-in. egg.....	3.50	3.50	3.50
2x3-in. nut.....	3.50	3.50	3.50
No. 2 nut.....	3.50		
No. 3 nut.....	3.50		
No. 4 nut.....	3.50		
No. 5 nut.....	3.25		
2-in. screenings	3.50	3.50	3.50
2-in. lump.....			3.50
3-in. lump.....		3.50	
Steam egg.....	3.50	3.50	3.50
Mine-run.....	3.50	3.50	3.50
Washed			
No. 1.....	3.50	3.50	
No. 2.....	3.50		
No. 3.....	3.50		
No. 4.....	3.50		
No. 5.....	3.25		

Williamson & Franklin County rate, 72 1/2c. Others, 57 1/2c.

